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THE

EDINBURGH MEDICAL AND SURGICAL JOURNAL:

EXHIBITING

A CONCISE VIEW

OF THE

LATEST AND MOST IMPORTANT DISCOVERIES

IN

MEDICINE, SURGERY, AND PHARMACY.

VOLUME FORTY-THIRD.

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THE

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ERRATA.

In Vol. xlii. page 254, line 26, *for* " case," *read* " cyst."
page 256, line 12, *for* " now," *read* " never."
page 256, line 26, *for* " now," *read* " never."
In Vol. xliii. page 11, line 28, the age of the fœtus injected by Dr Reid, should be stated at between " five and six months."
page 13, line 3, *for* " a circulation of the body," *read* " the circulation of the superior part of the body."

NOTICES TO CORRESPONDENTS.

Communications have been received from Mr GREENHOW, Dr SOMERVILLE ALISON, and Dr REID.

The following publications have been received:—

A Systematic Treatise on Comparative Physiology, introductory to the Physiology of Man. Translated, with Notes, from the German of Frederick Tiedemann. By James Manby Gully, M. D., and J. Hunter Lane, M. D., F. L. S. &c. &c. Lond. 1834. Vol. i. 8vo.

Medical Biography. A and B. By James Atkinson, Surgeon to H. R. H. the late Duke of York, &c. Lond. 1834. 8vo.

An Inquiry into the Nature and Properties of the Blood in Health and in Disease. By the late Charles Turner Thackrah. A New and Enlarged Edition, Arranged and Revised by Thomas G. Wright, M. D.; to which is prefixed a Biographical Memoir of Mr Thackrah. Lond. 1834. 8vo.

Animal and Vegetable Physiology; considered with reference to Natural Theology. By Peter Mark Roget, M. D., Secretary to the Royal Society, Fullerian Professor of Physiology in the Royal Institution of Great Britain, &c. &c. Lond. 1834. Vol. i. ii. 8vo.

A New Mode of Ventilating Hospitals, Ships, Prisons, &c. &c. being an Efficient Manner of Destroying Contagion, &c. By George Hawthorne, M. D. Belfast, 1830. 12mo.

Cases of Tic-Douloureux, and other Forms of Neuralgia. By John Scott, Surgeon to the London Hospital, and to the London Ophthalmic Infirmary, &c. &c. Lond. 1834. 8vo.

A Compendium of Pharmacy, explanatory of the Chemical Decompositions of the Pharmocopœia Londinensis; illustrated by New and Comprehensive Diagrams. By William Meade, Member of the Royal College of Surgeons in London, and Private Teacher of Medicine and Surgery. Lond. 1834. 12mo.

A Dissertation on the Best Mode of Treating Spasmodic Cholera, with a View of its History and Progress, &c.; together with an Appendix, containing a Review of Dr M'Cormack's Pamphlet. By George Stuart Hawthorne, M. D. Lond. 1834. 8vo.

The Gums; with late Discoveries on their Structure, Growth, Connections, Diseases, and Sympathies. By M. George Waite, Member of the London Royal College of Surgeons. Lond. 1835. 12mo.

The Principles of Ophthalmic Surgery, being an Introduction to a knowledge of the Structure, Functions, and Diseases of the Eye; embracing New Views of the Physiology of the Organ of Vision. By JOHN WALKER, Assistant-Surgeon to the Manchester Eye Institution, &c. London, 1834. 12mo. Pp. 195.

A Practical Treatise on Medical Jurisprudence, with so much of Anatomy, Physiology, Pathology, and the Practice of Medicine and Surgery, as are essential to be known by Members of Parliament, Lawyers, Coroners, Magistrates, Officers in the Army and Navy, and Private Gentlemen; and all the Laws relating to Medical Practitioners; with Explanatory Plates. By J. CHITTY, Esq. Barrister at Law. Part I. London, 1834. 8vo, Pp. 460.

Observations on Functional Affections of the Spinal Chord and Ganglionic System of Nerves, in which their Identity with Sympathetic, Nervous, and Imitative Diseases is illustrated. By William Griffin, M. D., Member of the Royal College of Surgeons in Edinburgh, &c.; and by Daniel Griffin, Member of the Royal College of Surgeons in London, &c. Lond. 1834. 8vo.

A Treatise on Tubercular Phthisis or Pulmonary Consumption. By JAMES CLARK, M. D. F. R. S., Physician in Ordinary to their Majesties the King and Queen of the Belgians. (From the Cyclopedia of Practical Medicine.) London, 1834. 8vo, Pp. 88.

An Introductory Lecture, intended as a Recommendation to a more Careful Investigation of the Constitutional Origin of Local Diseases, or Principles deduced from the Operations of Hunter and Abernethy. By GEORGE MACILWAIN, Surgeon to the Finsbury Dispensary, &c. London, 1834.

The Surgeon's Practical Guide in Dressing, and in the Methodic Application of Bandages; illustrated by numerous Engravings. By Thomas Cullen, M. D., late Staff-Surgeon in the Belgian Army. Lond. 1834. 12mo.

Treatise on Cholera Morbus, the Method of Treatment, and Means of Prevention. By Captain W. White, late of the Honourable East India Company's Service. Lond. 1834. 8vo.

London Medical Gazette, for the session 1833-34, from No. 49, Sept. 6th, to No. 52, Sept. 27; and from No. 1, October 1834, to No. 10, December 6, 1834.

The London Medical and Surgical Journal, No. 147, Vol. vi. November 29, 1834, to No, 149, December 6, 1834.

Baltimore Medical and Surgical Journal and Review. No. 3, April 1834. No. 4, July 1834.

The American Journal of the Medical Sciences. No. 27, May 1834. No. 28, August 1834. No. 29, November 1834. Philadelphia, London, and Paris, 1834.

The Dublin Journal of Medical and Chemical Science; including the Latest Discoveries in Medicine, Surgery, Chemistry, and the Collateral Sciences. Dublin, No. 16, September 1834. No. 17, November 1834.

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The following publications have been received:—

An Introduction to the Study of Medicine, comprising a brief exposition of the various branches of Medical Knowledge. By John Dowson, M. D., &c. 1834. London, 12mo.

Tables and Diagrams illustrative of Chemistry and Pharmacy. By John Murray, M. D. Fellow of the Royal College of Surgeons, Edinburgh. Edinburgh, 1835. 8vo. Pp. 71.

Description of the Inferior Maxillary Bones of Mastodons in the Cabinet of the American Philosophical Society; with remarks on the Genus Tetracaulodon, &c. By Isaac Hays, M. D. &c. 4to. Philadelphia, 1833. 10 Plates.

The American Cyclopædia of Practical Medicine and Surgery; a Digest of Medical Literature. Edited by Isaac Hays, M. D., Surgeon to Wells' Hospital, &c. Vol. i. Philadelphia, 1834. A—ANG. pp. 560. 8vo.

Clinical Illustrations of the more important Diseases of Bengal, with the result of an Inquiry into their Pathology and Treatment. By William Twining, Member of the Royal College of Surgeons of London, and First Assistant-Surgeon, General Hŏspital, Calcutta. Calcutta, 1832. 8vo. Pp. 705.

Outlines of Comparative Anatomy. By Robert E. Grant, M. D., F.R.S.E. &c. Professor of Comparative Anatomy and Zoology in the University of London. Part First, containing Osteology, Ligaments, and Muscles, illustrated with 65 Wood Cuts. London. 1835. 8vo. Pp. 144.

Lectures on the Means of Promoting and Preserving Health, Delivered at the Mechanics Institution, Spitalfields. By T. Hodgkin, M. D. London. 1835. 12mo. Pp. 449.

Transactions of the Medical and Physical Society of Calcutta. Volume the Sixth. Calcutta. 1833. 8vo.

Sketch of the History of Medicine, from its origin to the Nineteenth Century. By John Bostock, M. D., F. R. S., &c. London, 1835. 8vo. Pp. 252.

The Epidemics of the Middle-Ages, from the German of J. F. C. Hecker, M. D. &c. Translated by B. G. Babington, M. D., F. R. S. London, 1835. 12mo.

A Treatise on the Formation, Constituents, and Extraction of the Urinary Calculus; being the Essay for which the Jacksonian Prize for the year 1833 was awarded by the Royal College of Surgeons in London. By John Green Crosse, Surgeon to the Norfolk and Norwich Hospital, and Lecturer on Clinical Surgery, Member of the Royal College of Surgeons, &c. &c. London, 1835. 4to. Pp. 231. Lithograph Engravings.

A Practical Compendium of the Diseases of the Skin, with Cases, including a Particular Consideration of the more frequent and intractable form of these Affections. By Jonathan Green, M. D. Member of the R. C. S. London, &c. London, 1835. 8vo. Pp. 371.

The Medico-Chirurgical Review, and Journal of Practical Medicine, edited By James Johnson, M. D. Physician-extraordinary to the King. London. No. 43. January 1835.

The London Medical Gazette for the Session 1834, 1835, from No. 11, December 1834, to No. 15, January 10, 1835, and from No. 17, 24th January 1835, to No. 24, 14th March 1835.

The London Medical and Surgical Journal, from No. 149, December 6, 1834, to No. 163. Vol. vii. 7th March 1835.

The London Medical and Surgical Journal. Edited by Dr Ryan, No. 134, 135, 136, 137, 141, 159, 160, 161, 162, 163.

Records of General Science. By Robert D. Thomson, M. D. with the assistance of Thomas Thomson, M. D., F. R. S. L. and E. Reg. Prof. of Chemistry in the University of Glasgow. No. 1. January 1835. London.

The Monthly Archives of the Medical Sciences, January 1834, February 1034, March 1834. Three Numbers. Edited by Dr Hunter Lane. London.

ERRATUM.

In page 210, line 29, *for* albumen, *read* alburnum.

THE
EDINBURGH
MEDICAL AND SURGICAL JOURNAL.

1. JANUARY 1835.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Select Cases and Communications, forming part of the* TRANSACTIONS OF THE MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH. Communicated by the COUNCIL.

[*The Council of the Medico-Chirurgical Society, in proceeding to arrange a second Fasciculus of Cases and Communications for insertion in this Journal, agreeably to the plan announced in last Number, have found it expedient to select for that purpose a number of miscellaneous papers in various departments of medical science, several of which they regret not to have had an earlier opportunity of laying before the public. To these are prefixed a few cases which ought to have been introduced into the first Fasciculus. They purpose to insert in the April Number of this Journal a series of communications on the Diseases of the Thoracic Viscera; and, in the Number for October following, a series on the Diseases of the Abdominal Viscera. Communications which are intended to form part of the April Fasciculus will require to be forwarded previous to the beginning of February; those for the October Fasciculus, previous to the* 1*st May.*]

SECTION SECOND.

§. I.—CASES.

1. *Two Cases of Hemicrania.* By WILLIAM BROWN, Fellow of the Royal College of Surgeons.

IN the spring of 1818, I attended a man, aged about 50, a hard-working carpenter, of rather intemperate habits. He had been subject to headach for a considerable time, but it then assumed the form of perfect hemicrania. The pain occupied exactly one-half of the head, of the nose, and, he said, even of the tongue. The side affected (which was the right one) was slightly swelled, and red. For several days he suffered much from vomiting, and was occasionally delirious. After these symptoms had continued for some days, suddenly a great discharge of blood and purulent matter took place from the right ear and nostril; he was immediately relieved of his uneasy feelings, and was soon restored to health. This man was alive for some years after; but I lost sight of him, and am ignorant of his subsequent history.

Mr A. K. aged 24, not a robust young man, and rather dyspeptic, applied to me in January 1834, on account of a severe pain in the situation of the right eyebrow, or a little under it. He had suffered from the affection for a day or two, and it slightly injured his vision. There was some swelling and redness of the integuments, and it had the appearance as if a stye or small phlegmon was advancing. I recommended the application of a cold poultice; and was disappointed to see him in two days after, no better. There was still pain in the same spot, the same appearance of redness and swelling, and a tendency to tears in that eye. In a few days I again saw him; but there was no abatement in the symptoms, and as there seemed no tendency to suppuration, I felt alarmed lest mischief should be taking place at the periosteum. Leeches were applied without benefit, and they were ordered to be repeated. There was still no improvement; but as he incidentally mentioned that the headach was worse in the morning, and as his tongue indicated some disorder in the digestive organs, I hoped it might be periodical headach, and changed the plan of treatment. An emetic was ordered, followed by a purgative, and then by a solution of sulphate of quinine with sulphuric acid. I found, upon more minute attention to the symptoms, that the attack came on pretty regularly about four in the morning. He awoke some time before this hour with general unwellness; in a short time the pain began, and gradually increased till it was at its height, in three hours; it then gradually declined, and in about as long time it was gone. He continued uncomfortable and depressed during the forenoon, but in the afternoon and evening felt quite well. This treatment had no immediate effect upon the disease. On one day the attack began later, but continued the usual number of hours; another day it was less severe, but more protracted. The first thing which seemed to exert an influence over it was a grain of opium, given an hour before the usual time of the accession of the paroxysm. This not only moderated the pain, but shortened its duration; and on the second occasion, when it was used, it prevented the attack entirely. The disease lasted nearly three weeks.

These cases have but little in common with each other. The one consisted in acute vascular action leading to the formation of abscess, and occurring in a strong muscular man. The other was a chronic affection, with but little vascular excitement, and occurring in a person of a weak constitution. The one circumstance, however, of the pain in both being on one side of the head, leads me to place them together by way of contrast.

The latter belongs to a class of cases which are of pretty common occurrence. They are usually observed in persons who are in infirm health, who are liable to dyspepsia in one or other of its forms; and many females occasionally suffer in this way for a day or two before menstruation. Megrim is sometimes of short duration, remaining only for a few hours or days, but in other cases it assumes the form of a regular intermittent disease, preserving its terms of accession and departure with much regularity, and maintaining its hold for several weeks. When it becomes the subject of medical treatment, it is most successfully treated by remedies acting upon the digestive organs, such as emetics, cathartics, and tonics.

These circumstances justify us in referring this affection to a disorder of the general system, or of the digestive organs. But it must at the same time be presumed, that there is a local disease of the nerve affected, which causes the general disorder to influence it rather than some other portion of the nervous system. We are in great ignorance of the nature of local nervous diseases. No great attention was for a long period paid to them, and perhaps the diseased changes are not discoverable by our present modes of investigation. But they have recently received a greater share of notice, and the number of observations which have been made by accurate practitioners, gives the promise of a more extended acquaintance with them, and consequently of a more successful treatment.

The first of these two cases is interesting, as being not a common one, but one of those accidental abscesses, the discharge of which by two of the natural outlets could not have been anticipated from the previous symptoms. Its seat was probably deep in the soft parts around the mastoid process, and I regret that the notice of the case, taken by me at the time, gives so imperfect an account of symptoms which would have been very interesting now. The discharge of matter by the ear is a common occurrence in abscesses lying near that organ; but it is not very easy to understand how it could get to the nose; and some doubt may be perhaps entertained of the accuracy of the statement. I can only say, that my account of the case, taken at the time, mentions this, and that my own recollection is in accordance with it. There are cases on record where matter was evacuated by passages equally circuitous, and I reported to the Society, at a former meeting, one in which an abscess discharged itself from the bladder, rectum, and lungs.

So far the case is curious; but an inference of a practical kind may be deduced from it. It was inflammation surrounding and enveloping the *portio dura* as it emerges from the cranium, which gave rise to this peculiar distribution of the pain. In fact, perfect hemicrania was produced. Is it wrong to presume that in various cases of pain occupying one side of the head or face, inflammation or irritation of a nerve is present?

2. *Cases of Inflammation of the Orbital Linings.* By J. Craig, Esq. Surgeon.

—— a female, aged 33. I saw her on the 23d of October 1833, and found her complaining of most agonizing and deep-seated pain in the left eye, or rather in the orbit, extending to the head;—so intense, that during the night she was quite delirious; the conjunctiva was a good deal inflamed, and the eyeball protruded forward, with a feeling of much tension; the iris was slightly contractile, and vision somewhat impaired; the eyelids were distended, and unnaturally protuberant; and the pulse was strong, full, and beat 120. She was bled from the arm to thirty-five ounces, and six leeches were applied to the eyelids; she had a dose of calomel and rhubarb at bed-time, and jalap on the following morning; and saturnine lotions were applied to the eye after the bleeding.

24th. The local symptoms were more aggravated; the palpebræ were red on the surface, much swollen, and œdematous; the globe of the eye was more protuberant, and the least attempt to move it caused the most excruciating pain; the iris was quite immoveable, and vision gone; the constitutional symptoms were considerably relieved. The leeches had bled freely, and the medicine operated well. She had a blister applied behind the ear, and ten leeches to the eyelids.

25th. Very much the same. Had the aperient medicine repeated, as also the leeches, and to continue the saturnine applications.

26th and 27th. Symptoms not in the least relieved, and the protrusion of the eyeball still greater. Took twelve ounces of blood from the temporal artery; applied the leeches again to the palpebræ; a large blister to the forehead and temples; scarified the conjunctiva (which was much inflamed) very freely, and repeated the aperient medicine at bed-time and in the morning, and also ordered an antimonial mixture to be given every two or three hours.

28th. Last night the suffering was so extreme that she was unable to lie down, having sat up all night supported by pillows; early in the morning, of her own accord, applied again nine leeches, which bled freely. Had the aperient medicine repeated at bed-time and in the morning.

30th. The pulse became small and feeble; the eyeball dreadfully protuberant, but pulsation distinctly felt by the patient deep in the orbit; the bowels were operated upon well, and the febrile symptoms almost abated. Ordered a large warm poultice over the eye.

November 1st. During the night an abscess burst through the upper eyelid, near to the inner canthus, external to the *conjunctiva*, and discharged a considerable quantity of healthy purulent matter. Through the opening a probe could be passed over the eyeball, towards the external canthus, deep into the orbit. The pain was much alleviated, but the eye still very protuberant, and the eyelids red and œdematous. I directed a poultice of turnip to be applied over the eye.

2d. The opening still discharges a good deal of matter; the painful symptoms a good deal relieved. The bowels are regular, and the tongue clean. She was ordered two glasses of wine daily, and to continue the poultices.

3d. During the night another opening formed through the lower eyelid close to the inner canthus, through which a probe could be passed below the eyeball to the external canthus of the orbit, and matter was discharged freely from the opening.

From this date she had no bad symptoms. The poultices were continued for several days, then simple dressing, and a zinc lotion, and she recovered remarkably well, with vision quite perfect, but the eye easily fatigued.

In this case the pain was more severe than can well be described; the tumefaction and redness of the eyelids, and protrusion of the eyeball, presented a horrible appearance; the stretching of the retaining muscles, and deep-seated tender parts, the consequently altered position of the optic nerve, and insensibility of the retina, all deserve attention.

With regard to the treatment, it was from the commencement strictly antiphlogistic; and though, from the inflamed state of the eyeball itself and conjunctiva, I did not at first suspect a deep-seated abscess, and, for the sake of affording temporary relief, was on the point of evacuating the aqueous humour, yet the distinct pulsation felt, though not preceded by any rigor, induced me to change the application, and apply a warm poultice, which in a few hours gave relief.

Mrs R. was seized with a severe pain, extending over one side of the head, but principally situate in the left orbit. This she, for some days, attributed to decayed teeth, which she had extracted without relief. When I first saw her, she laboured under considerable fever; the pain, particularly over the forehead, was so acute as during the night to be accompanied with delirium; the eye itself was slightly prominent, hardly inflamed, and vision was quite perfect; there was a constant discharge of tears.

She was purged freely; had her hair cut out; leeches repeatedly applied to the temples, followed by cold applications to the head, and saturnine lotion over the eyeball. The fever abated, but the deep-seated pain in the orbit, the malar bone, forehead and temples continued. At one time I had a suspicion of matter forming in the malar antrum, but satisfied myself it was not the case. The eye became very gradually more prominent; the eyelids red and œdematous, and purulent matter was discharged through the nostril. At length an abscess pointed towards the inner canthus, external to the conjunctiva, was opened by Mr Liston, who saw the case with me, and a quantity of thick cheesy matter was discharged.

The discharge continued for some weeks before it altogether subsided, partly from the opening, and partly through the orbit. Astringent lotions were used, and the case terminated favourably.

Ratho, December 20, 1833.

3.—*Case of Hydrocephalus.* By J. H. Balfour, M. D., F. R. C. S.

In the beginning of May 1833, I was called to see James Cumming, a child thirteen months old, who was reported to have been attacked the evening before with convulsions, which had continued to recur at short intervals. When I saw the child he was in a severe convulsion, which was soon checked by the use of the warm bath, and the application of a stream of cold water to the head. When somewhat recovered from the fit I examined the gums, and found one of the teeth of the lower jaw requiring scarification, which I immediately performed. In the course of five or ten minutes the child was seized with a second convulsion, which lasted for several minutes, but was ultimately checked by cold applications to the head. Convulsions continued to recur in this manner at short intervals for several hours.

I learned that the child had generally enjoyed good health, but had been complaining for upwards of a week of feverish symptoms of a remittent nature, accompanied with great restlessness and frequent crying. He had already cut eight teeth, and during their appearance had occasionally suffered some degree of irritation. The bowels were stated to be confined, the abdomen was distended, the tongue furred, the pulse very rapid, and skin hot.

The head was ordered to be shaved, six leeches to be immediately applied, and the bleeding to be encouraged by warm fomentations. Afterwards, cloths dipped in cold water and vinegar to be kept constantly applied. A full dose of calomel and antimonial powder was also administered, followed in six or eight hours by castor-oil.

Next day the leeches were reported to have bled very freely. The convulsions became less frequent, but still recurred occasionally; the febrile symptoms were much mitigated; the skin cooler; the pulse 130; the bowels freely opened, discharging dark-coloured and offensive stools, while there was considerable stupor. Leeches were again applied, and the cold applications continued, while small doses of calomel were given regularly for the next two or three days. Under this treatment the convulsions ceased, but the febrile symptoms were little changed.

The stupor still continuing, and being combined with frequent startings and twitchings of the limbs, strabismus and screaming, on the 14th of May a blister was applied to the nape of the neck, which rose well. Scarcely any amelioration, however, of the symptoms followed. The pulse now varied from 160 to 180, and the startings were very frequent.

On the 17th the report was; The child lies in a drowsy state, occasionally starting, and uttering loud screams; much strabismus; pupils dilated, and insensible to the stimulus of light; skin cooler; pulse varying from 90 to 100, somewhat irregular; urine deficient. A blister was applied over the whole head, and doses of *Hydrargyrus cum creta* given repeatedly. Purgative enemata also were administered, and whey was given for drink.

20th. The torpid state continues, and the child appears to be in a confirmed state of hydrocephalus.

Believing that effusion had taken place in the brain, I had now very faint hopes of the child's recovery; and in this opinion

I was confirmed by Dr Graham, who accidentally saw the child at this time. The irritation of the blister producing little effect, I now resolved to try the effect of friction with croton oil. For this purpose, I took equal parts of croton oil and *Aqua Ammoniæ*, and rubbed a small portion of the mixture, three times a-day, on the nape of the neck and back part of the head. I at the same time continued the use of the mercurial remedies, which did not, however, produce any particular constitutional effect.

By using nearly one drachm of the croton oil liniment in successive portions, a copious pustular eruption was produced, which excited very great irritation. Soon after this there was a decided amelioration in the symptoms. The state of torpor became less profound, and sensibility gradually returned. The pulse resumed its natural frequency and lost its irregularity, while the pupils could be made to contract by the stimulus of light. The strabismus continued for a considerable time, but ultimately disappeared. In the course of eight or ten days the child was considered nearly out of danger. During convalescence some bronchitic symptoms appeared, which were subdued by embrocations, and the use of the syrup of squills. The eruption produced by the croton oil was long very sore, requiring the application of poultices and healing ointment.

I saw the child a week or two ago in good health. It has now got most of its first set of teeth, and seems to be remarkably stout and healthy.

This case appears to be very similar to that mentioned by Dr Traill in the second number of the Transactions of the Provincial Medical and Surgical Association, and considered by him as being one of hydrocephalus. It is an instance in which there were present all the symptoms of acute hydrocephalus, or that inflammatory affection of the brain which often ends in effusion of serum, but which may prove fatal without any effusion whatever taking place. It seems to me to be interesting, as showing, that, even when all the symptoms of this formidable disease are present, we ought not to relax our endeavours, from an idea that the case is beyond the power of medical aid. On this account I have been induced to lay the present imperfect notice before the Society.

The croton oil in this case was employed merely as a powerful means of counter-irritation, and as such it is superior to tartar-emetic ointment, from the rapidity with which it acts, and the violent irritation which it excites. I have now used it frequently, and with very good effect, in affections of the head and chest, as well as in rheumatism. Ten, twelve, or fifteen drops, either alone, or combined with hartshorn, &c. rubbed for ten minutes on the surface, and repeated twice or thrice, generally produces in six or seven hours heat, itching, and redness, succeeded in twelve or eighteen hours afterwards by a vesicular eruption, which soon assumes a pustular character.

15, *Dundas Street.*

§. II.—PHYSIOLOGICAL.

4. *Some Observations on the Structure of the Mesenteric Glands in the Balaenoptera rostrata.* By Dr JOHN REID.

DR KNOX having lately purchased a young whale, he very kindly allowed me a considerable portion of the mesentery, cut close to the spine, for the purpose of repeating the experiments of Mr Abernethy upon the organs in the whale that correspond to the mesenteric glands, as related in the Philosophical Transactions of London for 1796. This animal was a female, about ten feet in length, belonged to the *Balænoptera rostrata* of naturalists, and had been dead about a fortnight (February.)

An injection, composed of brown spirit varnish, white spirit varnish, and turpentine varnish, mixed in the usual proportions, and coloured with vermilion, was first thrown into the arteries, and the same materials coloured yellow into the veins. Both injections succeeded well, and very minute vessels were seen ramifying in all directions upon the surface of the intestines and mesenteric glands. The mesenteric glands appeared a little increased in size after the injection had been thrown in; but on handling them, the materials injected could not be felt to be collected into masses in their interior, as described by Mr Abernethy, except in one case, and this was evidently dependent upon extravasation. The lacteals were next attempted to be injected. These were more easily found than could have been expected, as the mesentery was completely void of fat, and all the small arteries and veins were filled with injection. Several of these vessels were injected; but in all, from the softness of the glands, or some other cause, the mercury seemed to burst into the substance of the gland, converting it into a sac, and none of it appeared in the *vasa efferentia.* On opening one of these glands, I was at first almost convinced that the mercury had passed into a cavity in the interior of the gland; and I had almost persuaded myself of the existence of an indistinct lining membrane upon its walls; but upon more minute examination of the others, and particularly as none of the mercury could be detected in the *vasa efferentia*, and as no such cavity could be detected in these not injected, I became satisfied that it had ruptured the vessels, and passed into the substance of the gland. On cutting into the substance of the glands in which the arteries and veins were only injected, these vessels were seen ramifying through their texture, dividing and subdividing very minutely, and nowhere presented the appearance of opening of cavities or cells. It also appeared to Dr Alison, who examined some of these glands under the microscope, that the whole of the injection was contained in the vessels. The glands themselves were of a uniform texture; and, with the exception of being of a darker colour, and their greater size, resembled very closely in their appearance the mesenteric glands in the human body.

Those who are acquainted with Mr Abernethy's experiments, will at once perceive that the results of the injections just described differ very materially from those obtained by that gentleman. Upon what this difference depends I cannot pretend to judge. Mr Abernethy does not mention the genus, species, or size of the whale from which he procured the mesentery; but it is evident, from some parts of his paper, that the mesenteric glands must have been much larger than those in the present case. The largest of these bodies in this case did not exceed a pigeon's egg; and when they appeared larger, this was found to depend upon two or more of these lying in close contact. It is not likely that these bodies can differ so very much in their structure in the different Cetacea as to account for results so dissimilar; and the disparity in size could only produce a difference in degree, not in character. Mr Abernethy used a waxen injection, which is considerably coarser than that which we employed. It appeared to Mr Abernethy, that some of the arteries and veins opened upon the inner surface of large cavities in the interior of the glands, into which they poured their contents; while in the present case, though the injection had run more minutely than what we could expect a waxen injection to do, none of it seemed to pass out of the vessels. It also appeared to Mr Abernethy, that a number of lacteals opened into the interior of these cavities, and probably mixed their contents with those of the arteries and veins. Whether there were any communications between the lacteals and veins, or whether the lacteals poured any of their contents into cavities or cells, these injections do not entitle us to form anything like a satisfactory conclusion; for the extravasation of the mercury into the substance of the gland prevented all accurate observation, and besides, the whole of the minute veins being filled with injections, it would be prevented from appearing in them, admitting that such communications did exist. We saw enough, however, to render it very improbable that the lacteals in this case opened into such large cavities as those described by Mr Abernethy. Dr Knox himself injected some eighteen or twenty of the lacteals two days previous to my attempts, immediately after the abdomen had been opened, before the mesentery had been detached, before the arteries and veins had been injected, and while the parts were still very fresh. The mercury passed freely through these vessels as the glands; but none of it appeared either in the veins or *vasa efferentia.*

5. *Injections of the Vessels of the Fœtus, to show some of the peculiarities of its Circulation.* By Dr JOHN REID.

THREE fœtuses were injected in the following manner: A red coloured injection was thrown up the *vena cava* inferior, and a yellow-coloured injection down the *vena cava* superior at the same time, and as much as possible in equal quantity, and with equal force, to endeavour to imitate the currents which flow along these veins during the life of the fœtus. As it is impossible that one person can manage both, it was necessary to intrust the two syringes to different persons; and this must render the success of the injection more precarious. It was principally wished by these injections, to try to ascertain to what extent the Eustachian valve prevented the intermixture of the two currents entering the right auricle by the two *cavæ;* and, provided that the Eustachian valve really had the effect of keeping the two currents to a certain extent separate, directing the greater part of the ascending current directly into the left auricle through the *foramen ovale*, whether these two currents still continued separate in their subsequent course,—that passing along the aorta going entirely to the large vessels of the head and superior extremities, and that through the *ductus arteriosus* filling the descending aorta.

The first trial was made on a fœtus of four months. By some mistake the injection was not thrown down the *cava superior*, and that thrown along the *cava inferior* was in small quantity. On examining the heart, we found that the red injection had passed along the *cava inferior;* that some of it had passed into the right auricle, but the greater part had been directed through the *foramen ovale* into the left auricle by the Eustachian valve, so as to fill the whole of the left side of the heart, while not a single drop of injection had passed into the right ventricle.

This experiment, then, was not entirely useless, for it showed, in this case at least, that a fluid ascending through the inferior *cava* passed more readily into the left side of the heart than into the right. That part of the injection should have passed into the right auricle, was to have been expected, for though the Eustachian valve when perfect nearly insulates the *cava inferior* from the cavity of the right auricle, yet it cannot entirely exclude the passage of some of the fluid into the right auricle, when that cavity is not occupied by the column of blood which descends through the superior *cava.*

The second trial was upon a fœtus at the full period. Upon examination we found, that, though the two currents chiefly passed in the course which we shall fully describe in the third experiment, yet some intermixture had taken place. This was not to any great extent. This intermixture might depend upon two causes. *First,* the Eustachian valve is supposed to be less perfect at the full time than at an earlier period; and, *secondly,* the injection was not so well managed as it ought to have been, from the difficulties experienced in two persons commencing and stopping exactly at the same time, and using nearly equal forces.

The third trial was upon a fœtus of about seven months, to judge from its size and the position of the testicles. Care was taken by a previous course of training, to throw in the two currents as equally as possible. On tracing the red injection upwards, we found that it had passed through the *foramen ovale* and filled the left side of the heart without any intermixture with the yellow, except very slightly at the posterior part of the right auricle. Not a drop of the yellow appeared to have accompanied the red into the left side of the heart. From the left side of the heart it ascended the aorta, and filled all the large vessels going to the head and upper extremities. The injection in all these vessels had not the slightest tinge of yellow.

On tracing the yellow downwards, we found it filling the right auricle, free from intermixture, except slightly at the posterior part of the auricle, as already mentioned. From the right auricle it filled the right ventricle, passed along the pulmonary artery, and filled the *ductus arteriosus,* and branches going to the lungs. On entering the aorta, it passed down that vessel, filling it completely without any intermixture of red; and thus, all the branches of the thoracic and abdominal aorta were filled with yellow. The whole of the red had passed to the upper part of the body. In an experiment of this kind, the injection, after filling the left auricle, passes along the pulmonary veins, but, during the life of the fœtus these veins must be filled by the blood returning from the pulmonary arteries. Had the injection been sufficiently minute, it would have passed from the pulmonary arteries into the pulmonary veins, and, consequently, we would have had some intermixture of yellow in the left auricle.

Though it may be doubted, whether these two currents keep themselves so distinctly separate in the living fœtus as they appear to have done in this last experiment, yet, from the result of these three injections, we may be justified in concluding, that the blood returning from the placenta principally passes to the head and superior extremities, and that the lower part of the body is principally supplied by the blood returning by the *cava superior*, or, in other words, by blood which has already made a circulation in the body.

§. III.—PATHOLOGICAL ANATOMY.

6.—*Some Account of a Case, with the Appearances on Dissection, demonstrative of the manner in which Hydatids are first generated in the Human Body.* By JOHN HOWSHIP, Teacher of Surgery, Surgeon to the St George's Infirmary, &c. &c.

THE exact structure of the simple globular hydatid (Acephalocyst of Laennec) is not sufficiently made out; neither has the mode in which it is first produced been hitherto, I believe, satisfactorily explained.*

The extreme simplicity of its form, and the manifest character of its structure, render it tolerably evident that the hydatid is a fine, smooth, transparent bag, of a rounded even figure, filled with a serous fluid; and it may be further presumed that the coat or cyst is essentially an albuminous matter. It has, however, been much doubted whether so simple a form can claim the regard due even to the lowest link in the chain of organized beings.

In a paper written in 1787,† Dr J. Hunter states, that he met with a large tumour, situated between the stomach and the spleen, made up of several smaller tumours, containing hydatids, which were completely spherical, adhering nowhere to the sides of the sac, nor to one another. The tumours or sacs he observed, had two coats; an outer, which was the strongest and thickest; and an inner, which was soft, tender, and pulpy. On examining these hydatids, the inner surface of some was found covered with small hydatids, not so large as heads of pins, and looking like minute pearls or studs set in the inner coat.

The author adds, that, in another case, the abdomen was irregularly swelled; and on examining the body, there were found numerous encysted tumours full of hydatids, and that the increasing volume of the tumour had even made its way upwards, through the diaphragm into the chest, yet not appearing to have done any injury to the parts, except by mechanical pressure.

In the above valuable paper, then, the author adverts to the apparent mode in which hydatids multiply, but without venturing to speculate on the manner of their first production in the body.

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* When this paper was written, I had not seen the work of Sir A. Cooper on the diseases of the breast, which contains many valuable remarks on this subject.

† Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, Vol. i.

The late Dr Baillie[*] says, that on the inside of the hydatid smaller ones are formed, which are commonly not larger than heads of pins, but sometimes they are even larger than a gooseberry. These are attached to the larger hydatid, either scattered at irregular distances, or in small clusters. They are also found floating loose in the liquor of the largest hydatids. It is then observed, that the origin and real nature of these hydatids are not fully ascertained, although it is extremely probable that they are a sort of imperfect animalcules. So that we may venture to conclude, that even the acute perception of so accurate an observer as Dr Baillie had no favourable opportunity for determining the origin of these appearances.

On the 9th of November 1831, my friend, Mr Spilsbury, of Walsall, a gentleman zealously devoted to the science of his profession, obligingly sent me the following case, with its accompanying specimens.

" A healthy youth, aged 14 years, had worked as a shoemaker till November 1830. He said that in 1828, having drank at a brook, he supposed he had swallowed some spawn of animal growth. On close enquiry, it appeared that he had feverish symptoms, and was frequently sick, presumably from an inflammatory cause; and these symptoms, with the incident thirst, had induced him to drink freely at the brook. The following summer he frequently coughed up blood, and very frequently bled from the nose. His mother spoke of him as a hearty boy previous to drinking at the brook, and said she was herself convinced that he had living animals of the newt kind within him.

" During life, from the distinct lobulated feel of the different tumours with which the enlarged abdomen was filled, it appeared probable it might prove to be fungoid disease of some of the viscera, especially as the superficial veins of the abdomen were enlarged and tortuous. Neither the appetite nor the secretions ever failed, with the exception of the bile, with which the skin and urine were highly tinged, the stools being white. The enormously enlarged abdomen measured six feet in circumference; the legs and thighs being loaded with œdema, while the thorax and arms were amazingly extenuated. He died on the 7th November 1831."

On laying open the abdomen, Mr Spilsbury found the whole of the viscera one confused mass of tumours, of which a large portion was, by dissection, detached from the right side. In opening the duodenum, a pulpy sac, like coagulable lymph, was cut into, containing probably a full pint of small hydatids, the largest about the size of a hazel-nut. These hydatids were of various tints, from a deep-green to a bright-yellow, swimming in a thin serous fluid.

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[*] Morbid Anatomy of the Human Body.

The whole of the bowels and other viscera were equally involved in this disease; the continued pressure from which appeared to have very much reduced the size of every viscus by exciting interstitial absorption. The liver, in particular, was diminished in thickness almost to the peritoneal coat, not more than about half an inch of its parenchymatous substance remaining.

The thorax was not inspected, for the limited time afforded did not permit the whole of this extensive disease being unravelled. In the cavity of the abdomen the adhesions were so numerous and intimate that there was neither beginning nor end; the examination, consequently, was only so far satisfactory as the time would permit.

On carefully dissecting the parts forwarded to me, I found that the mass removed from the right side, although composed of different textures, was certainly an entirely new formation. It appeared that acute inflammation had, in the first instance, led to a free effusion of fibrine into the abdomen; that, as the fibrinous matter became organized, new vessels after a time began to secrete serum (at certain points) into the substance of the fibrine; thus inducing the developement of serous cysts. These tumours had the appearance of extremely fine thin organized adhesions; and a considerable number of these cysts, some nearly of the size and form of hen's eggs, most of them of a spheroidal figure, and all connected together by extensive fibrinous adhesions, constituted the large mass removed from the right side of the abdomen.

The partial detachment of the external coat, from several of the tumours, ascertained that each organized, coloured and vascular cyst, contained within it a fine colourless albuminous cyst; devoid of red vessels, and having every character of what Dr Baillie has termed the true hydatid.

It struck me as extremely curious, that each fibrinous and vascular cyst contained one albuminous cyst or hydatid; and that this hydatid exactly fitted the space it occupied, so as to be at every point closely in contact with, though only lightly adherent to, the surrounding cavity.

Wishing to demonstrate the exact occupation of the cavity by its hydatid, I carefully dissected off one vascular cyst from the next; and, raising a small part of the outer coat by the assistance of a flat silver probe, progressively separated it more extensively, without rupturing the hydatid, until I had removed nearly the lower half of the outer or vascular cyst; a small portion of which was also detached, so as to expose the opposite, or upper end of the hydatid. I then attached four fine silk threads to the upper margin of the outer cyst, and cautiously transferring it to the moistened surface of a card-paper, it was lifted up, and allowed to slide very gently into a glass vessel filled with spirit of wine. But just at the moment when it appeared to the best advantage,—such was the influence of the spirit in producing contraction in the coat of the hydatid, and such the consequence of the lower specific gravity of the rectified spirit, leaving the weight of the hydatid only partially supported,—that the albuminous cyst presently separating from its surrounding attachment, fell heavily to the bottom.*

I next dissected off a cluster of two fibrinous cysts from the mass, and proceeded to open them, intending to expose only a part of the front of the hydatid in each, to avoid the possibility of its dropping out or leaving its place. In laying aside the covering of the first, I found that the fibrinous and vascular cyst admitted of being separated, with some care, into two or three lamina. Not having leisure to finish the examination at that time, the specimen was immersed in spirit of wine; and on returning the next morning to open the other fibrinous cyst, this was found to be simply a cyst containing serum, but no hydatid. On cutting away a part of the front of the cyst, it appeared that the immersion in spirit had induced a partial coagulation of its fluid contents; a scanty albuminous cloud having fallen to the bottom. This, then, was an exception to the remark previously made, that each fibrinous cyst contained one albuminous cyst or hydatid. †

Another apparent exception presented itself in opening an ovate fibrinous cyst, within which I found its enclosed hydatid everywhere in contact, and, as in the other examples, lightly adherent to the surrounding cyst; but, on closer observation, I perceived a line crossing the tumour, and tracing this line enabled me to ascertain that the one cyst, in this instance, contained two hydatids of about equal growth, pressed against each other, the containing cyst at one part only manifesting the slight remains of a former wall of partition. The adjacent surfaces of the hydatids had not the slightest tendency to adhere to each other.

In these examinations, I observed that the coats of the hydatids, thicker at one, were thinner and more transparent at other points of their surface, verifying the correctness of a similar remark previously made by Dr Baillie.

On opening one of the fibrinous cysts to expose the hydatid, I cut away to a small extent the front of the hydatid also, in the hope that the exact relation of the two textures might thus be exhibited to advantage. The experiment failed. The albuminous cyst, unrestrained by a confined volume of fluid, no sooner felt the influence of the spirit, than it contracted powerfully, becoming more dense and opaque, in parts curling up, it became almost inverted, and was soon reduced to less than half its original magnitude.—(See Fig. 3.)

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* See the drawing from this specimen, Fig. 1.

† See Fig. 3.

The fluid filling the cavity of each hydatid contained a variable proportion of albuminous matter in solution, as shown in its coagulation by alcohol.

On cutting open, and examining the internal surface of the hydatids, a number of minute points were generally found projecting into the cavity. These points were most frequently collected into a cluster, or little cushion, upon one part where the substance of the hydatid was thicker than elsewhere; but sometimes they were unequally dispersed, and more thinly scattered over the surface. Generally, these points were sufficiently manifest to the naked eye, but in some cases were only seen distinctly by the assistance of a glass. They most frequently appeared like minute pearls lying on the surface, but occasionally exhibited a less regular figure, pointed or flattened.

These minute spheres, or projecting points, were in every case so closely attached to the surface, as not to admit of removal; and by examining them with care, and applying the point of a lancet to them, under the microscope, it was apparent that they were generated within the substance of the coat of the cyst, and in no instance was the growth sufficiently advanced to induce or to admit the separation of the young from its parent.

These appearances, which have been noticed by Mr Hunter and other physiologists, have been regarded as showing the developement of the young hydatid, and the mode in which they multiply, although throwing no light upon the manner of their first production in the body.

We may now advert to that process of vitality, that series of effects, by which the first formation of the hydatid appears to take place.

So long back as in the year 1809, in examining the body of a woman,* my attention was particularly struck on finding within the chest a soft preternatural substance, as large as a human kidney, situated between the ribs and lungs, and proving to be a soft solid, secreted into a cavity or fine cyst, formed in some adventitious adhesions, the result of preceding inflammation.

This fact, as it presented itself, demonstrated not only the well ascertained truth, that fibrinous matter thus circumstanced becomes organized; it also proved that the capillary arteries distributed into the newly organized part, are occasionally gifted with the power of taking upon themselves the various offices of secretion, as readily and effectively as the vessels in parts of original formation.

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* The case is the 63d in my Practical Observations in Surgery and Morbid Anatomy.

In a case, then, like that before us, the following is the manner in which, as it appears to me, hydatids are first generated. Peritoneal inflammation inducing copious effusion, the resulting extensive adhesions become progressively organized; and subsequent to this stage follows the characteristic and peculiar action.

The newly formed capillaries secreting a thin fluid (at certain points) into the substance of the fibrine, give rise to the slow developement of serous cysts; and in the early progress, perhaps in the commencement of this action, a part of the albuminous matter secreted with the serum, coagulating as it is effused, forms a fine pellicle, lining the internal surface of the cyst; to which cyst it is for a time destined to remain lightly attached, although more intimately and permanently united with the surrounding substance of its own thin expansion.

There is every reason to believe that the little vesicle so produced, which, it is obvious, must of necessity be an exact cast of the space it occupies, has the power of absorbing serum from the surrounding surface,—a circumstance which at once provides for its progressive growth, with other incident consequences.

Now, of these incident consequences, that which is the most invariable is the release, sooner or later, of the little vesicle, or hydatid, from its place of confinement; the fibrinous organized cyst still yielding to the increased pressure of its contents, and the hydatid thus continuing to grow.

In the mass that I examined, certain parts of the fibrinous cysts were so thin, and so nearly transparent, that, had the patient lived a little longer, they must, in all probability, have been ruptured, when the contained hydatids would have been delivered or released into the general cavity of the abdomen. In this case, while the albuminous cyst or hydatid continued to absorb serous fluid, it would have still gone on to increase the remains of the fibrinous cyst from which it had escaped, eventually losing every trace of its former figure and purpose, so as to prevent the possibility of its being recognized on dissection. In truth, the continued agency of such pressure, as in one of Dr Hunter's cases,. induced interstitial absorption of the diaphragm, may be supposed adequate to excite the progressive removal of any other texture exposed to its influence; and this brings us down to that particular stage of the disease, in which death being the most frequent result, nothing is found on examination of the body, capable of explaining distinctly in what manner the hydatids ever were related to the cavity in which they eventually are found loose.

In one such case, an entire hydatid came into my hands, containing many quarts of fluid. The late Mr Blair had examined the body of a dropsical person after death, and found in the abdomen two enormous hydatids, the largest of which was accidentally ruptured, but the smaller he was enabled to preserve; and I subsequently put it up in Mr Heaviside's museum.

Having in my own collection a valuable specimen, presented by my friend, Mr Spilsbury, in which the right lateral ventricle of the brain became the seat of a considerable dropsical accumulation, containing a number of hydatids, I referred to this preparation, and observed, that, within the cavity of the enlarged ventricle, the numerous flocculent and filamentous expansions, and at one point a small imperfect cell, sufficiently demonstrate the remains of the fibrinous effusion and its consequences; giving reason to believe, that, whether the hydatids present themselves in one serous cavity or another, the mode of their first production is one and the same in every instance.

The form and appearance of the hydatids from the brain were exactly similar to those from the abdomen; yet, further to identify the resemblance, I opened the preparation, to ascertain the state of the internal surface of several. On making this examination, the appearances found were precisely those already described, in hydatids from the cavity of the peritoneum.

Again, we know that large collections of hydatids are sometimes found, either in encysted tumours, or in cysts formed within the substance of one or other of the viscera; appearances that explain themselves, when we recollect that the cellular, or parenchymatous textures, are subject to the deposit of fibrine, no less than those of serous and mucous cavities; and that the hydatids being in such instances found swimming here in purulent, or there in serous fluid, is a circumstance merely dependent on the tendency to acute or to chronic action, which may have prevailed in each particular instance.

The cellular membrane beneath the skin, the cellular texture connecting the muscles to each other, and even the finer cellular tissue uniting the individual fibres of a muscle together, have been the occasional seat of encysted tumours of this description; but one of the most curious examples, perhaps, on record, is a case that was under the care of Mr Keate, where a collection of hydatids was situated in the *diploe*, between the tables of the skull, in which the extreme obstinacy of the disease was only equalled by the persevering activity with which the treatment was followed up, by which the complaint was at length overcome.*

The hydatid appears to possess a vitality nearly similar in degree to that of the more usual forms of effused adhesive matter. The thin coat of the albuminous hydatid seems just as capable of preserving itself, and of resisting decomposition, (where the supply of fluid necessary for its growth is not withheld,) as the thicker mass, or less even substance of the fibrinous effusion may be. Yet these two conditions of matter differ widely from each other. The albuminous hydatid, although it may expand in volume or multiply in number, is still permanently the same as to its place in the scale of existence, while effused fibrine is subject to change, and susceptible of many successive degrees of advancement in organization.

The cause of this difference is, that the hydatid, notwithstanding it appears to possess a power of absorption from its surface, and also a power of appropriation for its own purposes of growth, is nevertheless incapable of becoming vascular, whereas the first step to advancing organization in fibrine is indicated by a number of red vessels passing into it.

It is not easy to determine with precision what the exact powers of any of the living solids would be independent of that requisite supply of fluids with which nature has bountifully and providently furnished them. Reasoning, however, by analogy, it seems fair to assume, that, as the simple, spherical hydatid, appears to be in every essential respect the same in structure with the more complex variety found in sheep, if each were examined under circumstances equally favourable, the former would manifest the same appearances of vitality that have been repeatedly demonstrated in the latter.

The inventive genius, and truly philosophical mind of Mr Hunter, first led him to suspect, and soon enabled him to prove, that the fluid contents of the egg are gifted with an appropriate measure of vital power to regulate temperature, and resist decomposition. Mr Hunter also considered that the blood, while circulating in its vessels, possesses a degree of vitality, a living principle; a privilege, it appears to me, unreasonable to deny to the serum, when effused by secretion into any circumscribed cavity.

On these grounds, I should feel disposed to consider that the true hydatid is gifted with a certain measure of vitality fitted for its peculiar mode of life, yet apparently of so feeble a description, as to render it more entirely dependent for its existence on the temperature and condition of the surrounding medium than any other animal with which we are acquainted.

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* See Med.-Chir. Transactions of London.

MR HOWSHIP'S ESSAY ON HYDATIDS.

Fig. 1.

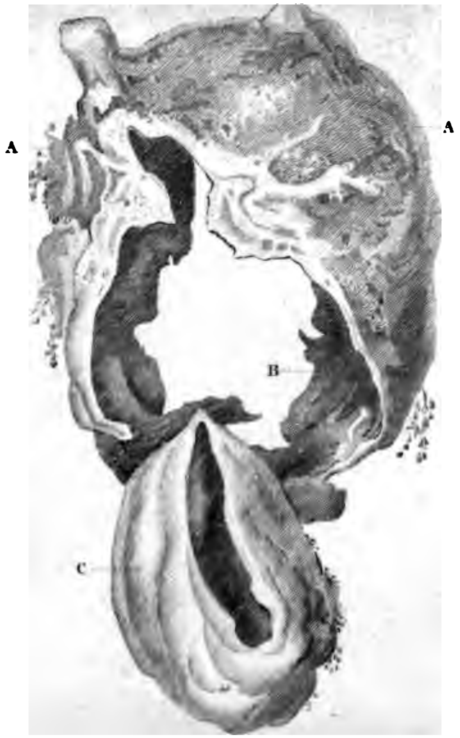
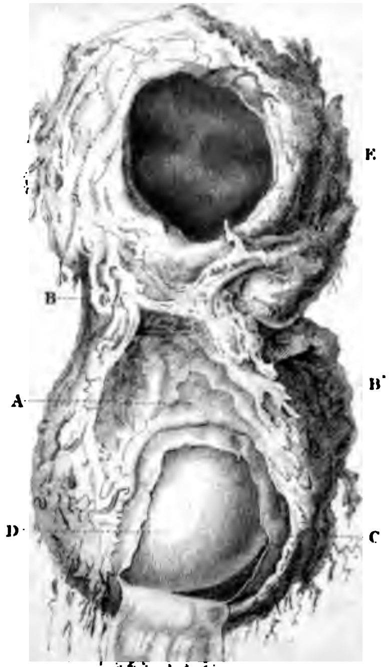


Fig. 2.



G. Aikman, Sc

Explanation of the Figures.

Fig. 1. A fibrinous and vascular cyst, from the cavity of which (portions of the outer cyst being dissected) the contained hydatid separated and fell out.

A. A. The external flocculent surface of the outer or fibrinous cyst, upon various parts of which the fine newly-formed capillary arteries were seen ramifying.

B. A part of the internal surface, comparatively smooth and even, of the cavity, from which the hydatid in the front of the figure fell upon its immersion in spirit.

C. The inner cyst or albuminous hydatid, which, previous to its displacement, filled the cavity of the outer or fibrinous cyst. The extraordinary extent of contraction it has undergone has been rendered more obvious by making an opening, letting out its fluid, and allowing the spirit to act more freely upon its substance.

On the internal surface of this hydatid numerous small points may be perceived with a magnifying-glass scattered at irregular distances over its cavity. This specimen is a remarkably thin hydatid for its size, and its contraction has been considerable in proportion.

Fig. 2. Two fibrinous and vascular cysts connected together by the fibrinous expansion. The lower cyst contained an hydatid; the upper serum only.

A. A part of the outer lamina of one of the external or fibrinous cysts separated and raised. The substance is extremely fine and thin.

B. B. Parts of the external cyst formed by heavy masses of solid fibrine, from which numerous lighter and flocculent portions are seen hanging down.

C. The inner, fine, and transparent lamina of the outer or fibrinous cyst exposed, a part of which, laid open, is turned down, so as to expose the smooth surface of the inclosed hydatid.

D. The smooth cyst of the globular hydatid, which, although entire, has undergone a certain degree of contraction by immersion in spirit, leaving a space between its own surface and that of the cavity containing it.

E. A very thick mass of compact fibrine, a part of the external covering of the other vascular cyst, the outer surface of which, at various points, is flocculent. The cavity of this cyst, which contained no hydatid, was filled with a serous fluid.

Fig. 3. A fibrinous and vascular cyst with its included hydatid, both laid open. The texture of this fibrinous cyst was comparatively equal, thin, and delicate.

A. The external or fibrinous cyst, in parts flocculent, and in many parts highly vascular.

B. The contained hydatid which, when first exposed, accurately filled the space to which it was adherent, but now much shrunk in size.

This hydatid, coarse, thick, and opaque, exhibited on its internal surface no trace of those little rounded points noticed in most of the other specimens.

21, *Saville Row, London.*

7.—*Some Observations on Phlebolites.* By Dr John Reid.

The accompanying preparation is a portion of one of the broad ligaments of the uterus, in the veins of which are observed a number of small rounded osseous-looking bodies, which have received the name of Phlebolites. They are described by Beclard in his Anatomie Générale under the chapter on Veins, and by Jules Cloquet in his Pathologie Chirurgicale; but I am not aware of their having been noticed by any English author, though they must have occasionally been seen by those much engaged in dissections. Their presence does not appear to be attended by any bad effects, and they consequently possess little practical importance; but the nature and cause of their formation may, ere long, become an object of considerable interest in physiology, as serving to strengthen or confirm some of the doctrines concerning the living fluids of the body. They cannot be considered as of rare occurrence. I have now seem them in five instances, and four of these have been within the last twelvemonths. In three of these they were found in the uterine veins; in one (a male) in the vesical veins; and in the present case, both in the vesical and uterine. They varied in size from that of a millet-seed to that of a large pea. They varied in number from two to more than a dozen. In all the cases in which I have examined them, they seemed to be placed loose in dilatations of the veins, allowing sufficient space for the blood to pass between them and the coats of the vein. Some of these veins were of very small size in the undilated portions, and required a careful examination to be convinced that they were placed in veins; while others were of sufficient size, as to render this apparent almost at the first glance. The subjects in which I found them were all advanced beyond the middle period of life.

Beclard and Cloquet describe them as being most frequently inclosed in layers of fibrinous matter or coagulated blood; but in all, except in the present case, I have found them without any covering whatever, and in nearly all of them of a bony hardness throughout.

In the preparation before you a very large one may be observed with a clot of blood. Several smaller ones were also observed enveloped in coagulated blood. The spermatic veins in this case, in the branches of which these were deposited, were much enlarged.

According to Cloquet and Beclard, they have been also found in the hæmorrhoidal veins, in the spermatic veins of the male, in the saphenæ veins, and twice in the *vena cava inferior.* In one of the cases described and delineated by Cloquet, he states, that the smaller ones were formed of a little soft clot of blood; that those of a larger size contained in the centre a nucleus of white fibrinous matter; that the largest had in their centre an osseous-looking nucleus, upon which the white fibrinous matter was arranged in concentric layers, the internal very hard, the others becoming gradually softer as they approached the surface. He also gives a drawing of a round fibrinous mass taken from the *vena cava inferior*, containing an ossific-looking matter in the centre, from which a number of rays of the same substance passed through the fibrinous matter towards the circumference. Another specimen similar to this was seen by Cloquet in Sœmmering's museum, and was said to have been taken from the *vena cava inferior* of a child.

I am not aware that the chemical composition of these bodies has been accurately ascertained. Cloquet speaks of them as composed of phosphate of lime, but he does not state that they were analyzed. Mr Kemp had the kindness to analyze two of them taken from different subjects. He has not yet been able to obtain accurate results; but he states, that he is certain that both were principally composed of phosphate of lime, of carbonate of lime, and of animal matter, and that it appeared to him that these earthy salts and animal matter were nearly in the proportions that exist in the bones. He has promised to make a more accurate analysis; and we will then see how far they differ from, or agree with, the osseous texture in their chemical composition. It may also be stated, that the animal matter seemed composed in a great part of gelatin; but this would require farther researches.

It becomes an interesting subject of inquiry, whether these bodies are formed by a deposition of the earthy salts contained in the blood, mixed with some of the animal matter, or whether this depends upon some vital action in the fluids, corresponding to the formation of the osseous texture. Neither Beclard nor Cloquet give any opinion upon the cause of their formation. The fact of their being only found in the depending veins, where the flow of blood is retarded, and the improbability of the formation of any osseous texture in the interior of these vessels, strongly favour the notion of their being merely depositions from the blood, as urinary calculi are from the urine; while the nature of their formation, the gradual conversion of the fibrinous layers into osseous, the radiation of the ossific matter through the fibrinous clots, and their chemical composition (if their similarity to bone is confirmed,) must strongly incline us to ascribe their origin to something more than mere physical or chemical laws. Additional observations, by furnishing more extensive data, may enable us to come to more decisive conclusions on this interesting question.

§. IV.—SURGERY.

8.—*Case of Rupture of the Tendon of the Biceps Flexor Cubiti.* By Sir GEORGE BALLINGALL, Regius Professor of Military Surgery, and Consulting Surgeon to the Royal Infirmary of Edinburgh.

MR D. a healthy active man, about 50 years of age, well known to many members of this Society as an eminent chemist and druggist, while raising a heavy weight, with the tips of the fingers of his right hand, suddenly felt a snap, accompanied with a numb pain, in the lower part of the arm, a little above the elbow. The weight instantly dropped from his hand, and he was conscious of an inability to use his arm as formerly. On endeavouring to take off his coat, within a few seconds after the accident, he had great difficulty in doing so, owing to the swelling which had already taken place in the arm. On examination, there was observed a large tumour about the middle of the arm, occupying the seat of the belly of the *biceps* muscle. This being considered by Mr D. as arising from effusion, he had a pretty tight bandage applied. He now felt scarcely any pain, and comparatively little inconvenience in the use of his arm.

Next morning, on removing the bandage and examining the arm carefully, Mr D.'s son, a medical man, was of opinion, that the tumour, which had now increased much, arose entirely from the retraction and swelling of the *biceps* itself. In this opinion he was confirmed by finding, that, in the hollow which existed below the tumour, there could be detected a body, apparently the tendon of the *biceps*, which was loose at one extremity, and could be moved from one side to the other with great facility. Bandages were now applied, consisting of two pieces of leather accurately and tightly laced, one on the arm and the other on the fore-arm, with a strap passing from the lower to the upper piece of leather, for the purpose of keeping the arm in the bent position. Owing to the patient using his arm much, the bandages were not kept accurately applied, and after ten or fourteen days they were thrown aside.

The tendon has gradually contracted adhesions to the neighbouring parts; and although there is still considerable swelling of the muscle, and some difference between the form of the two arms, yet the patient can use the arm tolerably well. It is not by any means so strong as formerly, and he cannot make any great exertion with it. He experiences difficulty, and some degree of pain or cramp in attempting to raise a weight with the points of his fingers, and finds the power of pronation considerably impaired in the affected arm.

The preceding history of this very rare accident was drawn up at my request by my friend, Dr J. H. Balfour. Having been in the country at the time Mr D. sustained this injury, I had no opportunity of examining his arm until nearly a week afterwards, when I was led, as others had been, to conclude, that the tendon of the biceps was undoubtedly ruptured, or perhaps rather torn from its attachments; for although the tendon could not now be moved freely from one side to the other, yet, upon throwing the muscles of both arms into action by bending the fore-arm against a resistance, the tendon of the left biceps sprung out as it were, and became tense, while no such thing happened in the right arm,—the flexion of the fore-arm being apparently accomplished by the *brachiæus internus*, the flexors of the carpus and fingers.

On examining the arms a few days ago, at the distance of eight months from the accident, I find that there is a considerable difference in their figure,—the belly or prominent part of the *biceps* in the right or injured arm being higher up, and somewhat different in shape from that of the left; immediately below the junction of the fleshy with the tendinous part of the muscle, there is a considerable thickness or swelling, apparently in the tendon, and when the muscle is thrown into action, the tendon of the injured arm is less prominent and distinct than that of the opposite side. Mr D. still finds the strength of the right arm considerably impaired. He complains of some difficulty in pronating the hand, and more especially in alternately rotating the radius outwards, and inwards, as he has occasion to do in the act of pouring any powdered substance out of a wide-mouthed bottle into the scales. This last mentioned circumstance I am particularly induced to notice, because, from the actions usually assigned to the biceps, it might have been supposed that the act of supination, rather than that of pronation, would have been impaired.

13, *Heriot Row*, 10*th May* 1834.

§. V.—PRACTICE OF PHYSIC.

9. *Notice of the late Influenza in Edinburgh.* By WILLIAM BROWN, Fellow of the Royal College of Surgeons.

No account of the late epidemic has yet been submitted to the Society. During its prevalence the duties of practitioners were much too harassing to allow of their engaging even in professional literature; and when it had ceased, few felt much desire to occupy themselves about it, and our attention became soon absorbed by other subjects. The following notices are so slight as scarcely to merit the consideration of the Society, but they will serve in lieu of a more elaborate history, and may afford hints to others who will do it more justice.

The term influenza, as popularly used, is very vague and indefinite. In the variable weather of our spring months, when any one has an attack of ephemeral fever, catarrh, or sore throat, he is often said to have the influenza; and this is uniformly the language employed when, from the extensive operation of the exciting cause, the number of persons affected is considerable. Medical writers limit the term to the disease when strictly epidemic; and although in some respects the disease may be essentially the same, yet the distinction is important, and ought to be maintained.

Influenza is no new malady, but seems to have been known in various countries from a remote period. Cullen, in his Synopsis Nosologiæ, under the title of "*Catarrhus a Contagio*," refers to a long series of epidemics at different intervals of time, and reaching back as far as the year 1323. Some of these are described with considerable minuteness by the authors who observed them, and they have all a strong resemblance to each other, and to the one which last visited this country. The history of that of 1658, given by Willis, is highly interesting; and, bating a little of the theories of the day, gives a most distinct view of the symptoms and treatment. In the second volume of the Edinburgh Medical Essays, there is a short notice of the epidemic which prevailed in Edinburgh and elsewhere in the winter of 1732, and this also seems to be very much the same as the one of 1833. In 1775, it is also much noticed; but in 1782 it attracted more particular attention; and the result of an extended correspondence from almost every part of the country enabled Dr Edward Gray (in the Medical Communications) to draw up a very full and satisfactory history of the epidemic. In 1803 it was again epidemic, and from its extensive diffusion and its great severity, it called forth the inquiries of many scientific practitioners. The observations furnished by these gentlemen, and the results deduced by them, are recorded with great fulness in the works of that period. Since 1803 there has been no epidemic influenza of very general prevalence. Some individuals believe that it has never wholly been absent from Britain, and that during every spring it has appeared in a more or less developed form, either as a separate disease, or as colouring and influencing other maladies. There have unquestionably been several instances during the past thirty years, when catarrhal fever has prevailed pretty extensively, and especially in the spring of 1819, when it exhibited very much of the usual character of influenza, and also in the winter of 1822-1823, which is described by Dr Stokes of Dublin; but no epidemic has been so well marked, and so extensive in its influence since 1803, as that of the last spring. Not only did it visit almost every town and village of Great Britain, but it spread extensively over the European continent, and there is reason to believe that it came to Europe, as most epidemics have done, from Western Asia.

Early in the spring of last year the influenza visited London, and there prevailed with great severity. It had already begun to abate in that city before it reached Edinburgh, and that was in the middle of April. The first case I saw was on the 20th. This seemed but an ordinary case of catarrhal fever, with only rather more depression than was usual. For a day or two longer a few cases of the same character presented themselves to my notice. But upon the 25th and 26th, cases occurred bearing all the symptoms of the epidemic influenza. After this the disease spread over the whole city, and very few families were exempted from its attacks. The epidemic lasted about eighteen or twenty days; embracing eight or ten days in the end of April, and nearly as many in the beginning of May. It has been computed that more than a half of the inhabitants had it in one or other of its forms. In many cases the different members of a family were attacked nearly simultaneously, and were confined to bed at the same time; but in others, individuals were seized successively after the interval of one, two, or three days. There was a great difference as to the severity of the attack. Many persons were so severely affected, either by illness or by positive debility, as to be forced to keep in bed; while others required merely to abstain from much exertion, and needed only to recline occasionally; and not a few were able to pursue their occupations, but with a strong feeling of unwellness, which would have induced them to be in the horizontal posture, had they not felt compelled by circumstances to exert themselves.

The duration of the attack did not in general exceed three days; indeed, two days may be stated as its more usual course.

This refers to the cases of influenza itself, because its consequences lasted for a longer period, wherever the affection did not at once yield.

The symptoms were, shivering, headach, pain in the back, muscular pains generally in various parts of the body, muscular weakness, loss of appetite, thirst, and cough. The former symptoms indicated fever, the last one marked the seat of the inflammation or congestion. The disease seemed to consist in an affection of the mucous membrane of the air-passages. Various parts of the canal were affected in various cases and different periods of the attack, indicated by sneezing, sore throat, cough, uneasy breathing; but cough was present in almost every case, and was therefore the pathognomonic symptom of the malady. In a few cases vomiting and purging occurred in sufficient prominence, and one case seemed pure dysentery. In other epidemics, the mucous membrane of the bowels and urinary passages have partaken considerably of the inflammatory tendency; but on this occasion, so far as I know, these cases were not frequent.

It may be supposed by those who did not witness the disease, that it was in no respect different from common catarrh, and that the epidemic consisted merely in a large number of cases. But a very limited experience was sufficient to mark it out very distinctly as so far a separate disease. Its distinguishing characters were the violence of the catarrh, the great extent of fever, the rapidity of its progress, and the weakness which accompanied, and usually followed it. The suffering endured by the patient was very great, and nothing but a previous acquaintance with the nature of the disease could have satisfied the medical attendant that there was not great danger.

It is not perhaps strictly correct to speak of the mode of treatment, because, from the overwhelming number of cases both in public and private practice, regular and systematic treatment was quite impossible; and because, from the short duration of the disease, the relative effects of various remedies could not well be ascertained. In truth, few of us have had before so good an opportunity of observing the natural progress and natural termination of a disease. A large number of cases passed through a regular course favourably, without any medical interference; and perhaps those which were most carefully treated would have just gone on in the same way if left to themselves. Probably we got a great deal of credit for our practice which we did not deserve, and merely employed our skill to the effect of retarding or thwarting the natural processes of the system. However, there were so many instances of natural termination of the disease by sweating, that we had ample encouragement to aim at this, and eht feelings of the patient usually pointed at it. The initial lassitude, shiverings, and muscular debility, required the recumbent posture in bed; and where any one, with symptoms at all well marked, struggled against these, and tried to keep on foot, engaged in bodily or mental exertion, and exposed to the atmosphere, these seldom failed to become aggravated. Diluent drinks were always desired by the sick, sometimes in the cold form, but more generally without any preference as to temperature. Demulcents of various kinds were useful in allaying the cough, at least they were thought so. Diaphoretics of various kinds were employed. I frequently used a weak solution of tartrate of antimony, with solution of muriate of morphia. This seemed to encourage perspiration, and at the same time allay irritability. In a great many of the cases where the patients were not of vigorous constitution or in robust health, I used wine and spirits freely from the very commencement; and in many the debility was so striking as to make this treatment indispensable.

Blood-letting was very rarely called for. I had not occasion to use it in any primary case of influenza. The affection of the bronchial membrane seemed to be much more of a congestive than of an inflammatory character, and to be relieved by other means. Many of the cases in plethoric and robust persons *seemed* to demand this remedy; but experience soon convinced us that it would give no greater relief than would be afforded by a delay of a few hours, and that it retarded the subsequent recovery. I do not deny that there were cases which required it, but I do not recollect of seeing any such; and I have no doubt, from the apparent urgency of the symptoms, and the desire of the patients themselves, that in many cases the practitioner removed blood which might have been spared. Blood-letting was, indeed, required in a good many cases, but these were all of the secondary affection, or what was called Relapse. This was what supervened at a longer or shorter interval after the critical sweat, and generally followed some exposure to cold, bodily exertion, or improper diet. The symptoms were in many instances very much the same as the original attack, but they indicated a different disease,—indeed a real inflammation. It is worthy of notice, that while the mucous membrane of the air-passages was the usual part affected in the primary attack, the relapse or secondary affection was by no means confined to this texture. The pleura was sometimes the seat of the inflammation, and sometimes the brain or its membranes. Acute rheumatism also in some cases supervened. This secondary attack almost always required bleeding, while, unhappily, the previous attack, by the weakness which it had induced, made the patient less fitted for bearing evacuations. Active treatment was indispensable, and it was not always successful. When death took place, it was almost always from the relapse.

The mortality of the disease required to be estimated by two different rules,—both absolutely in the actual number of deaths, and relatively in the proportion of deaths to the number of cases. I have no means of ascertaining the number of fatal cases; but I have good reason to know that they were very considerable. When, however, the number of persons affected is taken into consideration, the proportion of deaths must appear very trifling. The average number of deaths from continued fever may be estimated at one in thirty; from malignant cholera, one in three. Now, supposing only a half of the inhabitants of Edinburgh to have been affected, the mortality of fever would have given nearly 3000 deaths, that of cholera 25,000. From information obtained from the burying-grounds of Edinburgh, Canongate, and St Cuthberts, I find that the whole number of burials during April and May amounted to about 889, and that of these only about 37 were registered as being from influenza. It is not to be doubted that the increased mortality, although recorded under a number of other diseases, ought strictly to be referred to the epidemic malady; but we cannot think of these numbers without a feeling of gratitude, that a disease so extensively diffused was so little fatal.

Whenever we attempt to investigate the nature of any disease, with reference to the question of contagion, we find ourselves beset by various difficulties. These arise not so much from the existing prepossessions of all classes of society, (which a man of discrimination will be able to disregard,) as from the actual difficulties which surround the decision of the question. That the very contagiousness of diseases is influenced by the constitution of the atmosphere, is well known; for even small-pox, one of the most contagious of all, sometimes exists without showing any tendency to propagate itself, while at other times each case multiplies itself on every side, and thus an epidemic occurs. The same remark holds true of continued fever, of pertussis, and of some other diseases. We say that this arises from the constitution of the atmosphere, because the influencing agent is evidently one of very general operation, and we suppose that such an influence must come through the atmosphere; but we are entirely in the dark as to this matter, and there are some circumstances which seem to be very much at variance with such hypothesis.

There is another fact equally ascertained, and which tends to obscure the evidence of observers on this disputed question. It is the striking difference which exists among individuals as to their susceptibility of contagious influence. Some are affected by a very transient and slight intercourse with the diseased individual, while others endure the most intimate and long-continued intercourse without suffering from the malady.

It seems highly probable, also, that during the existence of an epidemical disease, the power of contagion itself varies in activity. Circumstances leading to this conclusion have often been observed, and they increase very much the difficulty of the investigation.

There has long been a difference in opinion among physicians as to the contagiousness of influenza. The popular voice is generally on the affirmative side of the question; and the name given by systematic writers, "contagious catarrh," seems to intimate that, as in other cases, the popular opinion has been founded upon an anterior medical opinion. Now, however, the negative side is that supported by a great proportion of professional observers, and the more the subject has been examined, the more general is the belief that influenza arises from some common cause, and is not propagated from one individual to another. There are many circumstances which seem to militate against this opinion, and every one has seen cases which are easily explicable on the ground of contagion; but the great majority of observations lean to the other direction, and are not easily reconcileable with that doctrine; and one interesting fact was, that the great bulk of persons exposed to the open air were attacked, while the great bulk of persons confined to the house escaped. There were doubtless many exceptions to both statements, but the observation was generally correct. If we add to this, the rapidity of its progress through families, and its appearing nearly at the same time in all quarters of the city and suburbs, we have considerations giving probability to the idea that it was not propagated by contagion. All that has been said is, of course, only an approximation to a proof; but it proves, that if influenza be contagious, it is so in a very different manner and degree from other diseases.

Table of Burials in Edinburgh during April and May 1832, and April and May 1833, with the numbers of Cholera and Influenza in these months respectively.

	1832.		Ch.	1832.		Ch.	1833.		In.	1833.		In.
Grayfriars, .	April,	152	52	May,	154	58	April,	78	1	May,	134	2
Canongate, .	April,	52	7	May,	41	3	April,	29	0	May,	49	1
Calton, .	April,	45	1	May,	52	2	April,	57	1	May,	101	18
St Cuthbert's,	April,	180	85	May,	123	20	April,	119	0	May,	175	13
Chapel of Ease,	April,	5	0	May,	12	0	April,	10	0	May,	15	0
Newington, .	April,	51	2	May,	40	0	April,	48	0	May,	74	1
		485	147		422	83		341	2		548	35

The total burials in April and May 1832 were 907, while the total burials in April and May 1833 were 889. Thus, the mortality during the prevalence of influenza was nearly as high as that during the prevalence of cholera.

I was not able easily to obtain an average of the burials in each separate month; but in the Calton burying-ground I found that the average of five years was as follows: 44½ in April, and 48½ in May. I am desirous of further inquiring into this subject.

10.—*An Account of Scarlet Fever, as it occurred in George Heriot's Hospital, in the months of October, November, and December* 1832, *and January* 1833. By WILLIAM WOOD, F. R. S. E. and F. R. C. S. E.

DURING the prevalence of scarlet fever in this city, and its vicinity, towards the end of the year 1832, and beginning of the year 1833, I enjoyed an opportunity of seeing many cases of the disease in George Heriot's Hospital, one of our largest charitable institutions for the maintenance and education of boys; and although I am well aware that I have nothing to communicate on the subject original in the way of remark, and nothing new to propose in practice, I shall lay before the Society a short account of the disease, believing that it will not be altogether uninteresting to the members to be in possession of a history of the complaint as it occurred in a number of individuals of nearly the same age, under the same roof, and altogether in a similarity of circumstances.

I am the more disposed to undertake this duty, because I shall thereby enjoy an opportunity of bringing under the notice of the Society an excellent history of the same disease, as it occurred in the same hospital in the year 1804, published by my much esteemed friend Dr Hamilton Senior, Physician to the Institution, in the appendix to his invaluable work on Purgative Medicines.

I may premise, that I have drawn up the history of the disease exclusively from the cases which occurred in the hospital during the late epidemic; and I have taken no notice of the many varied modifications of it which have been observed at other times and in other situations; nor have I made any allusion to the opinions or writings of medical men on the subject, it being my object to exhibit an accurate sketch of the disease, however rude, as it appeared in the hospital during the late epidemic, and to compare and to contrast that with the more finished picture of the same complaint, as it occurred in the same situation in the year 1804, drawn by Dr Hamilton.

George Heriot's Hospital, as is well known, stands in an open, airy situation; the rooms and wards are kept remarkably clean, and well ventilated; the inmates are well fed and clothed, and are in general remarkably healthy. On the 23d October, when the fever made its first appearance, the establishment consisted of 179 boys, from 8 to 14 years of age; of 17 female, and 10 male adults, making in all a family of 206 persons; all at that time in good health, with the exception of several of the boys being affected with chronic scrofulous sores.

An attempt was made to ascertain how many of the boys had previously been affected with scarlet fever; but the information procured on this subject is vague and unsatisfactory. I may state, however, that of the 179 boys, 33 were said to have passed through the disease; 91 not to have had it; and in regard to the remaining 55, nothing was known.

44 of the boys became affected with the disease during the continuance of the epidemic; of whom 5 were supposed to have had it previously; 26 not to have had it; and as to the remaining 13, nothing could be ascertained.

Of the 135 boys who escaped the complaint, 37 were said to have been previously affected with it; 67 not to have had it; and as to the other 41, nothing could be learnt.

The fever could not be traced into the Hospital; and it is rather remarkable that it appeared there while the inmates were under strict quarantine regulations, which had been enacted a considerable time before for the exclusion of cholera. It is not less remarkable, that, in another charitable institution in the near neighbourhood, containing nearly 100 young girls, in which similar quarantine regulations had been enforced, but had been removed some time before October, and the inmates had been allowed to communicate as usual with their friends in the town, scarlatina did not appear at all.

It ought, perhaps, to be mentioned here, that the son of one of the male servants of the Hospital, who, from the nature of his duty, is engaged during the greater part of the day with the boys, but who passes the night with his family in a small house immediately on the outside of the precincts of the Hospital, had been very tediously and dangerously ill of scarlet fever towards the end of August; the father, being in attendance on his son during his illness, was prevented from entering the grounds of the Hospital for nearly a month; and the first case of the fever which occurred in the Hospital did not take place for above a month from the time at which he was allowed to resume his duties. Under these circumstances, it does not seem at all probable, though perhaps not impossible, that the disease was introduced into the Hospital in this way.

From the time of its introduction into the institution, the disease spread rapidly, notwithstanding precautionary measures having been immediately taken to prevent, if possible, its extension. The boys who complained were immediately separated from their healthy companions, and were placed, as soon as the disease was ascertained to exist, in one of two rooms appropriated exclusively to the reception of patients labouring under scarlet fever. From these sick rooms they were removed to one of the sleeping wards fitted up for convalescents, where they were kept for a long time, for the purpose of preventing their coming in contact with the uninfected boys, and of hindering them from exposing themselves prematurely to cold air, which had in one case produced alarming illness.

At the end of one month from the first appearance of the disease, 30 of the boys had been attacked with it; at the end of the second month 12 more; and in another month 3 additional cases were added to the list, making in all 45 cases in three months. The two boys first affected were taken ill in the same sleeping ward, but afterwards the disease occurred indiscriminately in the five. The two first cases, and by far the larger proportion of the whole, came from the sleeping room appropriated to the use of the younger boys.

In order to show the rate at which the fever extended, I may mention, that 1 boy was taken ill on 23d October; 1 on 25th; 2 on 26th; 2 on 5th November; 2 on 7th; 2 on 9th; 1 on 10th; 1 on 11th; 3 on 12th; 2 on 13th; 1 on 14th; 5 on 15th; 1 on 16th; 1 on 17th; 1 on 18th; 1 on 19th; 1 on 20th; 2 on 22d; 1 on 27th; 1 on 28th; 2 on 30th; 1 on 2d December; 2 on 4th; 1 on 5th; 1 on 6th; 1 on 9th; 1 on 10th; 1 on 22d; 1 on 7th January; 1 on 8th; nurse on 20th; in all, 45 cases.

In stating the number of cases of scarlet fever, I think it right to mention, that twenty-nine of the forty-five patients were affected with both scarlet eruption and sore throat; and that sixteen suffered from sore throat only, without any eruption having been observed; these I considered as cases of scarlet fever, from the appearance of the throat and tongue, and from the nature and extent of the fever. It being now, I believe, generally admitted, that, in families where scarlatina appears, some, even of the individuals who have not previously suffered from that disease, are occasionally affected with it in the form of sore throat only.

That the complaint in the sixteen boys above alluded to was actually scarlatina, I consider proved by the fact, that none of them became afterwards affected with fever and eruption, though very freely exposed to the contagion in the sick rooms and convalescent ward. During the prevalence of scarlatina in the Hospital, many of the boys, independently of those here stated to have been affected with that disease, suffered from sore throat and temporary fever. I think there is little reason to doubt, that, in some of these cases at least, the complaint was a modification of scarlatina. I have not reckoned any of them, however, as cases of that disease, but I kept them separate from the scarlet fever patients, and as much as possible, consistently with the accommodation in the Hospital, from the healthy boys.

Of the twenty-nine patients who, in addition to sore throat, exhibited the scarlet eruption, two were said to have passed previously through scarlet fever,—twenty-two not to have done so,—and nothing was known with respect to the other five.

Of the sixteen patients who were affected with sore throat without eruption, three were understood to have been affected previously with scarlet fever,—four not to have been so,—and, with regard to the other nine, no information could be procured.

The epidemic fortunately proved a mild one, and one only of the forty-five patients died. I have no hesitation, however, in attributing, at least in some degree, the mildness of the complaint and the smallness of the mortality, to the favourable circumstances under which the sick were placed. The moment a boy complained, he was put under the care of one of the ordinary female attendants of the house; and, as soon as the disease was ascertained to exist, he was removed to one of the scarlet fever wards, which were under the charge of careful day and night nurses; and Dr Hamilton Senior and myself, the medical attendants, had unlimited powers from the governors of ordering whatever was thought necessary for the comfort of the sick and convalescent.

The disease generally commenced with headach, loss of appetite, and sickness, attended in some of the cases with frequent vomiting. These symptoms were very quickly followed by great frequency of pulse and heat of skin. In most of the cases the patients complained at the same time of pain in the throat and difficulty in swallowing. Vomiting was much more frequently met with in the commencement of the epidemic than afterwards, when it became of rare occurrence. This I was disposed to attribute to the early exhibition of purgative medicines, in consequence of the boys, from becoming aware of the existence of the complaint in the Hospital, reporting themselves to be sick at the very commencement of the disease.

The intensity and duration of the primary fever varied much in the different individuals. The pulse was in all of them very quick, and the skin intensely hot; and these symptoms generally appeared almost from the commencement of the complaint. Delirium and great restlessness were frequent concomitants of this stage of the disease.

It was remarked, that, after the fever had subsided, the pulse occasionally fell considerably below the natural standard, and continued so for some time during the patient's convalescence.

In all the cases there was more or less affection of the throat, although in some of them it was so slight and so little complained of, that, but for frequent examination, its existence might have escaped detection. I am disposed to think, from my own experience, that the existence of true scarlatina without some affection of the throat is a very rare occurrence, and that, upon careful and frequent inspection, it will generally be found to be more or less inflamed. In none of the cases was there any extensive sloughing of the throat; in several of them there was foul ulceration; in many the fauces and tonsils were affected with aphthæ, exhibiting, when these were removed, superficial ulceration. The fauces were frequently covered with a tough, dirty-white mucus, giving an appearance which might be mistaken by a careless observer for extensive sloughing. The submaxillary glands were generally more or less enlarged.

The scarlet eruption, in those cases in which it appeared, varied in the different individuals in intensity of colour, in duration, and in the extent of surface which it covered; and the degree of desquamation of the skin, which almost always took place to a greater or less extent, seemed connected with these circumstances. There was very frequently observed, previously to the appearance of the eruption, a considerable redness of the *tunica conjunctiva*, which came to be considered a pretty certain indication of its approach.

The tongue, in by far the greater number of cases, was moist; generally, in the early stages of the disease, white, with its papillæ red and projecting; giving an appearance considered to be in some degree characteristic of scarlatina. In the later stages it was frequently preternaturally red and tender, and occasionally superficially ulcerated. In one case, in which the throat was much ulcerated and foul, the tongue was dark-red, parched and glossy, and the teeth covered with brown sordes. In the milder cases there was little thirst. The mucous membrane of the nose was frequently observed to be inflamed.

Of the forty-five patients none died, and only three were considered in any great danger, *from the primary symptoms of the disease;* including under that term the affection of the throat, and the eruptive fever. Of those who were dangerously ill from these causes, one was James Souter, a boy of 12 years of age, who, during the first forty-eight hours of the complaint, was affected with very violent and frequently repeated convulsion fits. He had been attacked in a similar way during the eruptive stage of measles, and when labouring under hooping-cough. Another was Mrs Souter, the mother of James Souter, a widow of 28 years of age, who, after having acted for about two months as sick-nurse to about thirty of the patients, became herself affected with the disease, of which she was very alarmingly and tediously ill. From the continuation of foul ulceration of the throat, and from the duration of the accompanying fever, which partook very much of the typhoid character, there was much reason to fear that she would have died of exhaustion. The third case was George Watson, aged 12, who was also considered in great danger from the same causes which excited our apprehension in the last patient.

The treatment of the disease in its primary form was extremely simple. In some of the earlier cases emetics of ipecacuan were administered at the commencement of the complaint; but in the later cases purgative medicines were used in preference, and repeated almost daily till the fever had subsided, when they were continued at intervals, more or less short, till the patient was considered perfectly cured.

The purgatives employed were compound powder of jalap, Epsom salts, compound colocynth pills, infusion of senna, jalap and calomel, supertartrate of potass, &c. varied according to circumstances. The patients were kept in a room moderately cool, and well-ventilated; and great attention was paid to cleanliness. During the eruptive fever, when the heat of skin was considerably above the natural standard, the surface of the body was frequently sponged, sometimes with *cold*, but more frequently with *tepid* water; and this practice was continued till the skin became of a more natural temperature, and had begun to desquamate, in those cases in which the eruption had appeared. Great relief was derived from this practice, which was extremely agreeable to the patients. They were kept on low diet, being allowed only panado, gruel, or weak tea and bread, except in the cases, which were few in number, where the fever assumed much of the typhoid type, in which wine was cautiously given.

During the period of convalescence, the diet consisted of beef-tea, light pudding, or fresh broth. In a few cases, where the strength was much diminished, a little wine was thought necessary. There were only eight cases, however, in all, in which wine was employed. The warm bath was frequently used, and apparently with much advantage, in diminishing the feverish excitement, and in bringing down the pulse during the desquamation of the skin. At this stage of the disease, with the view of preventing, if possible, the dropsical symptoms, a tea-spoonful of the supertartrate of potass was given twice or thrice a-day to almost all the patients, along with occasional purgatives. In one or two of the cases, after the fever had subsided, moderate doses of laudanum were found useful in allaying irritation, produced by the state of the skin, and in procuring sleep.

In a few cases, where the throat was much swelled and inflamed, leeches were applied; but more generally this affection was treated by the use of a stimulating gargle, consisting of infusion of roses, containing a proportion of muriatic acid, and tincture of capsicum. Where there was great tenderness of the throat, this gargle was found occasionally too stimulating, and hot milk and water were employed in its stead.

The principal danger of the disease was occasioned by *the secondary affections*, including under that head dropsical effusions, swelling and suppuration of the glands behind the ear, and suppuration in the ear. During the period of convalescence, nine of the forty-five patients became affected with dropsical swelling. In three of them, in the form of slight œdema below the under eyelids; in four the œdema affected the face as well as the eyelids; in two it was more extensive, affecting in one of them also the hands; and in the other, in whom the disease proved fatal, the face, hands and arms, feet and legs, and, as was proved by dissection, effusion of serum had taken place into the cavities of the head and abdomen. The average period at which the dropsical symptoms appeared from the commencement of the fever was nineteen days,—the earliest being sixteen, and the latest twenty-three.

In consequence of the first patient who was affected with scarlet fever having fallen a victim to the dropsical affection, the nurses were very watchful, and generally pointed out the first appearance of œdema, which usually showed itself below one or both of the under eyelids. Jalap, or neutral salts, with calomel, were immediately administered, and the warm bath was employed. Whenever symptoms occurred indicative of any internal affection, particularly when attended with fever, general or local blood-letting, according to circumstances, was had recourse to; and these were immediately followed by the employment of tartrate of antimony in small but frequently repeated doses,—a medicine which proved essentially useful in many of the cases. The supertartrate of potass, and in one or two cases the tincture of digitalis, were prescribed as diuretics, but along with purgative medicines.

The patients who became affected with dropsical symptoms were not those who had been most severely ill of the primary fever.

In five of the nine boys who suffered from secondary affections, one or more of the glands behind the ear became swelled and inflamed. In one the swelling acquired a very large size, gave much pain, and when opened, there were discharged from it several ounces of well-formed purulent matter; in the others the swellings were discussed. In these affections leeches were employed, and cold solutions in the first stage, and warm fomentations and poultices in the second. Two or three of the boys suffered from suppuration in the ear; but only in one of them did this prove a tedious or troublesome affection.

Three of the patients, who had been affected both with sore throat and distinct scarlet eruption, had a renewed attack of fever, followed by sore throat and scarlet eruption, during their convalescence, and this secondary illness so much resembled well-marked scarlatina, that, had I not seen the patients under the first attack, I should not have hesitated for a moment in declaring that they laboured under that disease in a distinct and decided form. The secondary eruption was of shorter duration than the primary, and was not followed by desquamation of the skin. The state of the throat was exactly the same as in the first attack.

One of the patients thus affected was Daniel Mathieson, aged 11. He was originally taken ill on the 7th November, and was considered cured on the 2d December; having had the fever in a very distinct, and in rather a severe form; the throat had been much inflamed and ulcerated; the eruption had been very vivid, and there had been much desquamation of the skin.

On the night of the 4th December he slept ill, owing to pain in a slightly enlarged gland behind the right ear. On the 5th he was hot and uneasy, and his pulse quick; he vomited after having taken a dose of sulphate of magnesia with calomel. In the evening a copious scarlet eruption appeared over the body and limbs, apparently of the same character with the rash in scarlet fever; and the throat became inflamed and painful, the inflammation being of a dark-red colour. On the 6th the rash was nearly gone; the skin was more cool; the pulse 84; took a dose of salts; on the 7th, the rash was quite gone, the throat was still much inflamed, and the tonsils swelled; the face was flushed, and the pulse 100. These symptoms gradually went off, and on the 19th, he was again convalescent. *

It remains a matter of farther inquiry, how far certain persons who have been affected with scarlatina in its most perfect

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* There is a case recorded by Mr G. Hamilton in the 114th Number of the Edinburgh Medical and Surgical Journal, in which scarlet fever seems to have taken place for a second time, during the existence of secondary affections of the disease, in consequence of strong exposure to contagion. He says, "a girl (Watt) in Arthur Street, was seized with the fever. The eruption came out well, and continued out about the usual time; but when she was getting better, a febrile state and symptoms of dropsy began to appear. While this girl laboured under the dropsy, a brother, who had been living at some miles distance, was brought home also affected with the primary fever. They both slept in the same bed, and about three weeks after the eruption had disappeared from the girl, she had a distinct aggravation of febrile symptoms, with a second well-marked eruption."

form, may remain subject to a recurrence of the disease, even after a short interval of time, in the event of their being freely exposed to the contagion. In the three cases which occurred in the hospital, the secondary eruption, fever, and affection of the throat appeared when the boys were surrounded by numerous companions labouring under scarlatina.

Two of the boys when ill of *secondary symptoms* of the disease were attacked with erysipelas in the face and head,—a complaint extremely prevalent at that time in the town and its vicinity, as well as in the hospital; and one of them had no less than four attacks of erysipelas in the course of his convalescence from the fever, in all of which it was seated in the face and head.

Having now concluded this very long, and, I fear, very tedious history of scarlet fever as it occurred in George Heriot's Hospital, I shall intrude on the time of the society for only a very short time, for the purpose of bringing under notice the very able and interesting account of a similar epidemic which appeared in the same hospital in the year 1804. It is published by Dr Hamilton Senior, under whose care the patients were. There is a very great similarity in the two epidemics. The first case of the disease appeared in the end of September 1804, and it continued to prevail for three months. There were at that time 120 boys, and 20 adults in the institution. Upwards of 50 of the boys took the fever, which was mild and little dangerous in the primary stages; but it proved fatal in three of the patients from the secondary affections.

" In all the children, particularly in those who were first affected, the symptoms were so mild, that, but for my knowledge of the prevalence of the epidemic in town, I might have mistaken the disease on its first appearance, and been lulled into a blameable security. The throat was not much affected; the uvula and amygdalæ were slightly swelled and inflamed in every instance; in a few cases, superficial suppuration and sloughing appeared. The efflorescence on the surface was partial, and in general transitory, leaving a peculiar paleness of countenance. The eye was dull and heavy. Sickness and prostration of appetite continued throughout the disease. The thirst was moderate; great debility prevailed in every case; and in some a peculiar dejection and despondency, hardly to be looked for in subjects so young. The pulse was variable; always quick, till towards the end of the disease, when it sometimes sunk below the natural standard; it was never full. The surface of the body was occasionally of a pungent heat. Obstinate constipation prevailed in general.

" My patients were objects of serious attention for twelve or fourteen days; the convalescent state of almost all of them was protracted for nearly the same length of time; and six weeks elapsed before some who entered the sick room left it.

"Such was the appearance, and such is the history of this epidemic in Heriot's Hospital; in conducting the care of which, I employed purgative medicines fully; while food suited to the weak appetite and feeble powers of digestion was directed.

"The effect of the purgatives was favourable. The feces were hard, generally of a black, or greenish colour, and fetid; and sometimes of the colour and consistence of clay, and less fetid. In proportion to the evacuation of these feces, relief was perceptible. Returning appetite and vivacity accompanied the decline and cessation of the various symptoms.

"As the weather had become cold, and otherwise inclement, the children were detained in the sick-room for many days after they were perfectly well; purgatives were administered, as the state of the bowels demanded; and the general warm bath was repeatedly used, on the supposition that, by its restoring a perspirable state of the skin, it would, in concert with the purgative medicines, tend to prevent dropsical swelling, which, from the symptoms, I greatly dreaded.

"At last, healthy, and robust, and impatient of farther restraint, the convalescents were permitted to return to their particular wards, and, in no long time, to mix with their companions in school and at play.

"Happy I am that I had been thus careful and provident in using these precautions; for I have to relate the fate of three boys, who, in two or three weeks from their passing from under my care, were again reported as unwell, and again appeared in the sick-room. Their symptoms and their fate were the same. They had a leucophlegmatic look, incipient anasarca, total prostration of appetite, scanty, if not suspended secretion of urine, swelling of abdomen, obstinate constipation, nausea, extreme debility, and feeble pulse.

"Alarmed by these symptoms, I requested Messrs Alexander and George Wood, surgeons to the hospital, to join me in consultation. Suitable cordials were ordered, and purgative medicines of appropriate quality, and in repeated doses, were directed. The disease, in all the three, proceeded with a rapidity which afforded little farther opportunity for deliberation or action. The stomach gave way; all food, cordials, and medicines, were rejected, by vomiting. The watery effusion rapidly filled the cellular membrane, and inundated every cavity. Within less than thirty-six hours from the recurrence of the ailment, the boys died, labouring under symptoms denoting ascites, hydrothorax, and hydrocephalus.

"This termination was altogether new; I had never seen dropsy from scarlatina fatal. In consequence of this event, I approached the hospital for many days under deep anxiety, because I was conscious that other children were at the time in a situation which might lead to the same unfortunate issue." *

As some of the cases which occurred in Heriot's Hospital during the late epidemic appear to me to be interesting, from the nature and severity of the secondary affections, which proved fatal in one instance, I consider it almost unnecessary to apologize to the society for bringing under their notice these cases in detail, and for giving an account of the appearances found on dissection in the body of the boy who died.

Archibald Bain, æt. 10, was attacked with scarlatina on the 23d October, and had both eruption and sore throat. The fever did not run very high, but was of long duration, and materially diminished his strength. On 9th November, when convalescent, though still confined to bed, œdema appeared in his face, and soon extended to his hands and feet, attended by violent pain in the back part of the head. These symptoms were somewhat alleviated by the treatment employed; but they soon returned in an aggravated form, and on the 20th November he was attacked with violent convulsion fits, frequently repeated, attended with excruciating pain in the head. At one time he was deprived of his eyesight, which, however, returned, and he remained sensible at intervals, till within a few hours of his death, which took place on the 23d November.

During the existence of the dropsical symptoms, the urine was found to contain albumen, and was of less specific gravity than usual.

When the unfavourable symptoms appeared, from being languid and feeble, it was not deemed prudent to employ general blood-letting. A number of leeches were repeatedly applied to the temples and forehead, and blisters to the head. The bowels were powerfully acted upon by calomel and saline purgatives; and diuretics, particularly tincture of digitalis, were administered.

Dissection.—Before opening the body, it was remarked, that the œdema had very much subsided. After sawing through the skull-cap, the *dura mater* was found to adhere very firmly to it. A great deal of venous engorgement appeared on the brain, and the sinuses were full of coagulated blood. Considerable effusion had taken place between the arachnoid membrane and the *pia mater*, the former being preternaturally thick. The *puncta rubra* were not more numerous than usual, and the substance of the upper part of the brain was quite natural. One or two ounces of serous fluid were found in the ventricles, with ramollissement of the *fornix*, *nates* and *testes*. The *choroid*

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* Appendix to Dr Hamilton's work on Purgative Medicines, p. 59, &c.

plexus was not so vascular as in the healthy state. The *corpus callosum*, *thalami*, and *corpora striata*, were quite natural in structure and appearance.

A small quantity of serous fluid was found in the abdomen. The intestines, kidneys, &c. seemed to be quite sound.

It was ascertained that several children of the family had died of hydrocephalus.

David Gray, aged 9, was attacked with scarlatina on the 7th of January, and was affected with a considerable degree of sore throat, and with scarlet eruption. The disease, on the whole, was rather severe. On the 25th, when convalescent, but still confined to bed, slight œdema appeared of the left upper eyelid. On the 27th, both the eyelids were œdematous; all the functions, however, were natural. For several days he had taken calomel and other purgative medicines. In the evening of this day, he complained of severe pain in the head, and the œdema of the face had considerably extended. He took a dose of the infusion of senna, which produced both purging and vomiting. On the 28th, he had slept well; the headach was quite gone; the tongue was clean, skin cool, and pulse 70. The infusion of senna was ordered to be repeated, which produced the same effects as formerly.

29th. 9 A. M. Had complained much of pain in the forehead during the preceding afternoon. The œdema of the face was somewhat increased; the pulse below the natural standard. At 10 P. M., he became insensible, and was seized with strong convulsions. He was put into a warm bath; a large blister was applied between the shoulders, and sinapisms to the feet; a stimulating injection was given, which operated freely. Since 3 A. M., he has been sensible, complaining occasionally of pain in the fore and back part of the head; the œdematous swelling of the face is considerably diminished; tongue clean; pulse 72, and irregular. Ten leeches were applied to the temples and forehead, and a dose of calomel and sulphate of magnesia ordered. 4 P. M. Has vomited frequently, in consequence of which the calomel and salts were not given, but he had a purgative injection. The leeches have bled very freely. He has had since morning many attacks of convulsions. He is at present insensible, and the muscles of the right eye and mouth, and side of the face, are in constant convulsive action. The pupils of both eyes are dilated, and insensible to the light of a candle; the pulse is quick, irregular, and feeble; he has been occasionally sensible to-day between the fits. 8 P. M. Convulsions went off soon after four o'clock, and have not returned; he is quite sensible, but seems to have a difficulty in speaking; the eyes are of a more natural appearance, and the pupils contract on the approach of a candle. Pulse is not so quick, and is more regular. Cold to be applied to the forehead and temples. 30th. The convulsions have not returned; he slept well, and was quite sensible during the night, and he complained only of occasional pain in the head. To-day he is free from headach or any other uneasiness; pulse 72, soft and regular; he now speaks easily. 31st. Slept well, and has continued free from all pain. From this time he continued to improve, till the 6th, when there was slight œdema of the right side of the face, which was removed by purgative medicines, and from that period he continued to convalesce.

William Lapsley, aged 11, was taken ill on the 9th November, and was affected with both sore throat and eruption, attended with a pretty smart degree of fever. On the 25th, when convalescent, he complained of pain in one of the glands behind the left ear, and of severe pain in the back of the head. The face was observed to be slightly œdematous. He was ordered to be bled, but only two ounces of blood were procured; and calomel and saline purgatives were administered. On the 26th, the swelling of the gland was rather increased in size, but was not inflamed externally; he complained much of pain in it, stretching up to the top of the head. Ten leeches were applied to the neck, which bled freely. In the evening, his head was more painful, his breathing was hurried and oppressed, and the œdema of the face increased. Six ounces of blood were taken from the arm, which was somewhat buffy. The purgatives were repeated, and acted freely. He slept ill during the night, complaining much of pain in the *left side* of the head. On the 27th, pain of the head was somewhat lessened, œdema of the face had nearly disappeared, and the breathing was much relieved. Pulse was 84, and soft; a warm bath was administered, after being removed from which, a copious perspiration broke out, and he seemed much better. At night, the swelling behind the ear was enlarged in size, and more painful. The pain in his head, and the œdema of the face, were much increased, and the breathing was hurried and oppressed; a dose of calomel was given, and one-sixth of a grain of tartrate of antimony, dissolved in water, ordered to be administered every two hours.

28th. The calomel operated freely; he vomited several times after taking four doses of the antimony. Pain in his head and neck, he said, was almost entirely gone, and the breathing relieved. Pulse was 84. He was ordered to take one-eighth of a grain of tartrate of antimony every hour, and to have the warm bath. After the bath, he seemed lively and well. Towards night he complained much more of his head; œdema of the face was increased; and was very restless; moaned and screamed out during his sleep. Twelve leeches were applied to the temples, which bled freely, and the antimony was continued. On the 29th, his face was less swelled, and the headach quite relieved. He had passed a better night, and was in a state of nausea from the antimonial medicine; pulse 80, and soft. The solution was ordered to be continued, and half a drachm of supertartrate of potass to be given. In the evening, pain of the head had returned, and twelve leeches were applied to the left temple, which bled freely. He was ordered to take one-eighth of a grain of tartrate of antimony every quarter of an hour.

30th. Complained during the night of pain in the *right side* of his head, and his sleep was much disturbed. He remained in a state of nausea for five or six hours, when the medicine was intermitted. To-day he looked more lively, and says the headach is gone; pulse 100, and soft; bowels very open. Towards afternoon, complained again of pain on the *right side* of the head. The tartrate of antimony was ordered to be given, by which he was kept in a state of nausea for some hours. He had some quiet sleep, and perspired freely. The eyes, which were occasionally dull, appeared more lively, and the iris, which had been sluggish in its action, contracted more readily on the approach of a candle.

1st December. The headach was gone; pulse 82, and soft. He was in a state of nausea during the night, and slept more quietly. Swelling behind the ear was much diminished in size, and gave no pain. Continued well till the 4th, when he began to complain of pain in the *left side* of his head; pulse was 96. The antimony was ordered to be given every quarter of an hour.

5th. He became sick and vomited after a few doses of the antimony, and since that time has been free from pain in his head. Slept well; pulse 82; seems lively, and makes no complaint. Was ordered to take a dose of cream of tartar thrice a-day.

From this time he continued to improve daily, and, on the 14th January, he left the sick-room perfectly well.

Alexander Bain, aged 12, brother of the boy who died, was taken ill on the 14th November, and became affected both with sore throat and eruption. On the 4th December he was removed to the convalescent ward.

Having incautiously exposed himself to cold on the forenoon of the 6th, he was taken ill at night with fever, and severe pain in his legs and thighs, in consequence of which he was brought back to the sick-room, and placed among the patients labouring under scarlet fever.

7th December. 9 A.M. Face is a good deal œdematous; passed a restless night; is in a state of perspiration. A dose of calomel was ordered. 4 P. M. He has complained since morning of severe pain in the breast; the œdema of the face is increased; pulse 84; the calomel has not operated. Eight ounces of blood were ordered to be taken from the arm, and a dose of salts was prescribed. 8 P. M. The blood, of which fully nine ounces were taken, flowed freely; it is cupped, and exhibits some appearance of size. There is a scarlet eruption on the face and upper part of the breast; pain of breast is quite gone; the œdema of the face is rather diminished. Salts operated well; pulse 92; skin hot. One-eighth of a grain of tartrate of antimony was ordered to be given every quarter of an hour. 8th December. Vomited after taking four doses of the antimony, when it was intermitted. A dose of saltswas ordered to be given this morning, which operated well. He coughed frequently during the night. An additional quantity of scarlet eruption appeared late last night on the upper part of the breast and face, which to-day is nearly gone; the œdema of the face is much diminished; skin is less hot; pulse 84; tongue clean; is free from pain. From this date he continued to improve, and was reckoned again convalescent on the 19th December. The urine passed during the existence of the œdematous symptoms was not coagulable by heat.

On the 29th December, while still confined to the sick-room, he complained again of severe headach, and pain on both sides of the neck behind the ears, in consequence of which he took five doses of the tartrate of antimony, at intervals of a quarter of an hour, which produced vomiting and free general perspiration. 30th. The headach abated last night, and he slept well. To-day, complains of much pain on both sides of the neck, and of pain and difficulty in swallowing. The throat is inflamed; the face flushed; and skin very hot; pulse 118. There is upon the breast and other parts of the body a blush of red, very much resembling the eruption of scarlatina. The solution of tartrate of antimony was ordered to be given. 31st. Took six doses of the antimonial mixture, after which he became sick and vomited, and after the interval of an hour it was again exhibited. He took eight doses, which produced sickness but no vomiting. Betwixt 7 and 8 P. M. he complained of very violent pain in the forehead, in consequence of which, seven ounces of blood were taken from the arm, when sickness and vomiting came on. The blood was very buffy; slept well; and on awaking in the morning, said the pain in his head and neck was completely gone. The eruption continued visible for some hours after the visit of yesterday, but disappeared in the evening. At present he makes no complaint. The inflammation of the throat is less; skin cool and soft; tongue clean and moist; bowels open; pulse

80. 1st January. About 2 P. M. yesterday, complained again of severe pain in the forehead; was hot and restless. He took eight doses of the antimonial solution. At 7 P. M. he became sick and vomited, and perspired freely, after which the pain in the head was very much diminished. He slept quietly during the night. To-day he is entirely free from pain.

2d January. At 2 P. M. yesterday, complained of some pain in the right side of his neck; skin was very hot; pulse 120. At 10 P. M. complained greatly of pain in his throat; the tonsils and fauces were much swelled and inflamed, and of a dark-red colour. Took two compound colocynth pills, and used the stimulating gargle. 3d January. The bowels were moved freely during yesterday. He still complains to-day of much pain in the throat, but the swelling and inflammation are less; tongue is foul; skin hot; pulse 120. To have a dose of Epsom salts. 4th. Salts operated well; passed a quiet night; has much less pain in swallowing, and the inflammation of the fauces and tonsils is greatly diminished. There is some inflammation of the mucous membrane of the nostrils; tongue cleaner; skin cool; pulse 100. Two aloetic pills to be given at bed-time. 5th January. Pills operated; is in all respects much better; pulse 80. From this time he continued to improve rapidly, and on the 14th left the sick-room quite well.

The two boys Bain belonged to a very large family, of whom two had died of water in the head.

George Wright, aged 11, was seized with scarlet fever on the 15th November, and was affected with both sore throat and eruption. The eruptive fever was rather severe. On the 2d December slight œdema of the face appeared, and continued more or less for some days, without any other unpleasant symptom. Purgative medicines and supertartrate of potass were administered. On the morning of the 8th December he was free from complaint, but at night he complained of pain in his throat, soon followed by headach and heat of skin. On the 9th, at 10 A. M. he was very uneasy, complaining much of headach; his breathing was quick and oppressed; pulse 120; the heart beating very strongly; his face was flushed and slightly swelled; the skin was hot, and on the breast and body covered with a scarlet eruption; one of the glands behind the right ear was swelled and painful. Ten ounces of blood were taken from the arm, and a dose of calomel and sulphate of magnesia were prescribed. 3 P. M. The blood flowed freely, and in a full stream; it is cupped and sizy; he has perspired copiously, and he seems very much relieved; pulse is less frequent, and is soft; purgative medicines have not yet operated. Was ordered a dose of Epsom salts. 9 P. M. The salts were rejected by vomiting, but his bowels have been moved; pulse 100; skin cool; eruption has disappeared; tongue dry and foul. Was ordered to take the solution of tartrate of antimony during the night if he became more uneasy. 10th, 10 A. M. Took the solution twice, in consequence of having complained of pain in his head; he became sick, and the pain abated, after which he slept well; complains of pain in a small swelling behind the right ear, but says he feels generally better; the nose and upper lip are much swelled, and covered with erysipelatous inflammation; skin soft; tongue loaded; pulse 120 and full. Two compound colocynth pills were administered, to be followed at the distance of three hours by a dose of Epsom salts. 8 P. M. The erysipelatous inflammation has extended over part of each cheek; makes no complaint; skin moist; pulse 96. 11th, 10 A. M. Purgative medicines operated well; there is much uneasiness in the throat in swallowing, but it cannot be examined in consequence of the swelling of the lip; skin hot; pulse 120. One-eighth of a grain of tartrate of antimony was ordered to be given every half-hour. 8 P.M. Seven doses of the antimony were retained, the eighth was vomited. There is a copious perspiration all over the surface of the body; pulse 80 and soft; small vesicles have appeared on the face. 12th. Passed a good night; complains of pain in his throat and behind the left ear. The erysipelatous inflammation has disappeared from the right cheek, but is extending on the left, where it is of a darker red, and several vesicles have formed upon it; pulse 100 and soft; bowels very open. 13th. Complains principally of pain behind the left ear; inflammation of the left cheek has extended upwards to the scalp; skin hot; breathing quick; pulse 125; bowels open. A dose of the antimonial solution to be given every half-hour. 14th. After taking seven doses of the mixture he vomited, after which he was much relieved; the skin became cooler; the pulse less quick; he passed a good night, but at eight this morning complained of severe pain in the upper part of his head. Two doses of the antimonial solution were given with relief. The erysipelas has extended over a considerable portion of the scalp; there is much inflammation and swelling of the left eyelids; vesicles on the cheek have discharged; pulse 120; bowels open. Antimonial mixture to be repeated. 15th. Complains principally of extreme tenderness of the scalp to touch; the inflammation of the left cheek and temple has much abated; pulse 120; bowels open. 16th. Skin having become hot and dry, took two doses of the antimonial solution. Two compound colocynth pills were given last night, which have operated. Inflammation of head and face much abated. 17th. Skin cool; tongue moist; pulse 106; inflammation abating. Soon after this date the erysipelas disappeared. He continued, however, to recover slowly till the end of January, having in the interval complained much of pain in both ears, but without any discharge. In the beginning of February he was sent to his own ward and to school.

On the 15th of that month he returned to the sick-room, in consequence of an attack of erysipelas in the left cheek, attended with fever and much headach. Leeches were applied to the temples; purgative medicines were given, with the occasional use of the antimonial solution, from this date to the 20th, when the erysipelas disappeared, leaving, however, frequent attacks of severe pain in the head, which were treated by the frequent application of leeches, by blistering, &c. &c. On the 25th the upper lip was much swollen, and erysipelas appeared on both cheeks, which continued for some days, attended with fever, much pain in the head, and occasional delirium.

March 11th. Since last report has continued to complain occasionally of much pain in his head and breast, with almost constant throbbing pain in one or both ears, but, on the whole, has been gradually improving.

March 28th. Has continued much of an invalid, though occasionally out of bed, and has almost constantly complained of more or less pain in both ears, from which there has been discharged to-day a quantity of purulent matter. He had a slight threatening of erysipelas on the 24th.

April 16th. Has continued to convalesce slowly, complaining occasionally of pain in the head and ear, in consequence of which complaints he is still confined to the sick-room.

From this time he continued to improve in health, and made a complete recovery.

11. *Case of Recovery from Suspended Animation.* By Dr MACWHIRTER, Vice-President of the College of Physicians.

BY way of encouragement to my obstetric brethren, who must occasionally meet with cases of new-born infants suffering from suspended animation, I beg to trouble the Society with a brief detail of a case which lately occurred in my practice, and terminated favourably.

I was called, at about half-past 11 P. M. to a lady who had been several hours in labour. I found the *os tincæ* expanded to the extent of a crown piece; the membranes pressed forward by every pain, and the presentation "*breech*" pain recurring regularly and forcibly every four minutes. About a quarter before one, the membranes gave way, the *liquor amnii* was discharged, and the labour, which was a first one, advanced slowly, until half-past one, when the breech was born. Suspecting that resuscitation would be necessary, I desired the nurse to have warm water at hand.

The body and head were long *in transitu*; the funis was round the neck twice; I disengaged it, but could feel no pulsation. I got my fingers into the mouth of the fœtus, and succeeded in bringing it beyond the verge of the perineum, but it did not breathe. In about ten minutes, by management and the uterine action, the head was delivered, and along with it the placenta.

The infant appeared *dead*; indeed, it was thrice felt convulsed *in transitu*. The face was as white as paper, but there was some colour in the lips; still no pulsation of the heart could be felt.

I placed the child, with the placenta attached, in a warm bath; gently inflated its lungs with my own breath, in the usual way; rubbed brandy on the chest, abdomen, and head, spine, extremities, &c. As the funis when cut did not bleed, I therefore tied it. After immersion for about half an hour, I took it out of the bath; dried, and wrapped it in warm flannel, and made the nurse carry it near the fire. I then continued the gentle inflation from time to time, and the spirituous friction, to the extent of nearly two bottles of brandy and whisky, occasionally slapping the bottom, when at length, about forty or fifty minutes after birth, it gave a sob. This was indicative of existing life, and encouraged me to persevere. It continued to sob or gasp at intervals of a minute or two, and I now found that I could feel the heart beat.

The above means were most perseveringly continued, until the circulation and breathing very gradually increased. At the end of an hour and half, the child gave a whimper; the eyes opened; the lips became red; it breathed regularly; cried lustily. It lived, and continues to live.

4, *Ainslie Place*, 15*th April* 1833.

ART. II.—*Contributions to Thoracic Pathology.* By RICHARD POOLE, Esq. Assistant-Surgeon to the 32d Regiment.

1. *Pleuro-Pneumonia and Pericarditis, following an injury of the head.*—Private George Roberts, Inniskilling Dragoons, aged 26, admitted into hospital (Limerick) January 24, 1833, with an incised wound over the left side of the frontal bone, stated to have been produced last night by falling on the broken edge of a basin. The wound had been dressed at the hospital of the 83d Regiment, but, as there appeared much swelling and evident fluctuation under the integuments, I was induced to remove the straps, when, on opening the wound, a considerable quantity of sero-purulent fluid escaped. The bone was found denuded of the pericranium to some extent, but no fracture nor depression could be discovered. There was very great general

excitement, with pain of head, which induced me to bleed to ℥xxiv. when the pulse fell, and nausea followed. Cold applications were ordered to the back of the head, and a cataplasm to the wound. Some purgative having been taken before he came into hospital, which was now beginning to operate, I declined giving him any more.

25th. States that he is much better, and that the pain is easier. The wound looks well, and has discharged much purulent matter on the poultices. There is a slight blush about the integuments, with some swelling of the left eyelids and cheek. The bowels were moved twice since last night; the tongue is white and moist; the pulse soft, but quick; a little heat of skin; thirst: no nausea.—*Rep. cataplasma et frigida: Haust. Imperialis pro potu.*

26th. Passed a pretty good night, and reports his head to be easier. The wound continues to discharge purulent matter, but has rather an unhealthy look. Less puffing and redness of the integuments, and they do not pit; the left palpebræ still swollen. No rigor, or nausea; bowels very loose; thirst; the pulse is quick, moderately full; the skin rather warm; complains of cough, which occasions headach. Some numbness of the toes of the right foot.—*Omit. haust.* Rice water.

27th. Passed a bad night, agitated by dry cough, pain of the stomach and bowels, diarrhœa and nausea. The abdomen is slightly tumid and tender about the epigastrium and left lumbar region; the tongue is red at the tip, brown and moist at the root; great thirst; nausea rather abated this morning; pulse pretty full, soft and quick; skin warm; head quite easy. No redness about the wound; it looks clean and discharges healthy matter. The pericranium is only detached from the bone along the extent of the wound.—*Hirud.* xij. *epigast. et hypogast.*

Vespere. Leeches bled well; great relief from pain; pulse soft, not nearly so quick; skin warm, some moisture about the arms; head easy; no nausea; bowels still loose; thirst; cough much easier; expectorates freely.

28th. Passed a pretty good night, sleeping occasionally; head very easy; stomach retentive, but there is still complete anorexia, amounting to loathing; thirst continues; pain of abdomen greatly mitigated; pulse soft but quick; less heat of skin; cough very easy, not complained of; bowels still loose, four fluid evacuations since the evening visit, but without pain or tenesmus; the countenance is improved. The wound is looking well, without much discharge, and less redness and swelling. A rubefacient to the epigastrium.

Vespere. Blister did not vesicate, but acted well as a rubefacient. The diarrhœa has abated, and the patient says he feels well about his bowels. Has a little appetite, and requests some food. Still very considerable erethism; pulse quick, full, but soft; skin warm; distinct exacerbation.

29th. Says he passed a quiet night, and that he feels better this morning; reported, however, to have been raving and incoherent. The erethism appears unabated, without evident local phlogosis; has no diarrhœa, nor pain at epigastrium, or other part of the abdomen; no nausea, or rigor; less anorexia; cheeks a little flushed; wound looking well; no headach. He complains of sharp stitches in several parts of the right side of the chest, increased by full inspiration, attempts at cough, change of posture, or pressure; respiratory murmur well developed throughout this side; pulse nearly 100, weaker than before; skin still warm; strength a good deal impaired, but he is still able to leave his bed without assistance.—*Hirud. temporibus; emplast. rubefaciens thoraci; mistura mucilag. sedativ.*

7. P. M. Leeches did not fasten; fresh ones are just being applied. Another distinct exacerbation; the head is apparently more involved; slight tendency to delirium and picking the bed-clothes; face flushed; countenance comatose; no pain in any part of the abdomen, but there is much general fulness; pulse 114; well developed; heat considerable; no alvine evacuation since last night; stomach undisturbed; much thirst; no rigor. He has been visited by the surgeon of his regiment, who apprehends inflammation in the brain, or its membranes.

8. P. M. The leeches bled well, and the pulse has fallen in frequency and force, being now very soft and compressible; head very easy; appears more collected, and says he has more strength to cough; the cough is hard, harassing, attended with a very viscid, frothy, rusty-tinged expectoration; in fact, this appears almost peripneumonic. Less pain about the chest since the rubefacient was applied; a pint of blood stated to have been drawn by the leeches; skin less warm. Considerable loss of resonance from the nipple downwards, on the right side, is recognized; the respiratory murmur is very obscure, attended at times with mucous râles and distinct bronchial whiffing; the breathing above the nipple is clear and unmixed.—*Mistura expectorans.*

30th. 8. A. M. Passed an indifferent night, and raved a good deal; the pulse has fallen much in force and quickness since last night; no complaint made of head. Some castor oil that was given has produced two or three easy evacuations; still much thirst; tongue furred, rather dry; cough continues. The wound was dilated at the request of Mr Callow, the surgeon of his regiment; but nothing was discovered, except an inconsiderable dent on the bone, at the lower part of the wound. This was evidently the imprint of the body with which he had been struck;

and which has been ascertained to have been a heavy pistol one of his comrades had thrown at him.

11. A. M. Remains as at last visit, with the exception of the left side of the face, which has become of a deep red colour; cough troublesome; expectoration decidedly vitreous, and tenacious; in fact, peripneumonic; the breathing is hurried, noisy, and apparently difficult; loss of resonance very evident in anterior right lower chest; distinct bronchial breathing and bronchophony, with occasional crepitus in the lower lobe posteriorly. A diagnosis made of peripneumonic hepatization of right lower lobe. Decubitus easiest on the left side.—Calomel and opium.

4. P. M. Appears drowsy, somnolent, nearly comatose. The eyes are turned up; cheeks less flushed than before; answers questions rationally when roused; says he has no pain; breathing perfectly easy; no cough; pulse reduced in volume and quickness, it is now soft, and not frequent; no redness of conjunctivæ. Has taken three pills, each of which contained $\frac{1}{8}$ gr. *Acet. Morphiae. Omit. Morph. Cont. Calomelas; inungt. Ung. Hyd. fort.*

$\frac{1}{2}$ past 8. P. M. Has sunk very much since last report, and appears now moribund; breathing slow, in catches, without stertor, but with great heaving of the chest; slight tracheal rattle; face not flushed; expression comatose; eyes turned up, exsanguine; perfectly rational, and answers questions distinctly; says he has no pain; pulse very hurried, 140, soft, small; skin very warm; has coughed only once since last report.

As a chance existed that the present condition of the patient might have been owing to some effusion under the membranes of the brain, it was judged justifiable to have recourse to the operation of the trephine. Accordingly, assisted by Mr Callow, I proceeded to perform the operation; but on laying bare the cranium to some extent, and finding a perfect adhesion between it and its envelope, the interosseal vessels bleeding freely, and nothing like fracture or lesion appearing, we agreed to proceed no farther. The wound was dressed with adhesive plaster. A very considerable quantity of blood was lost during the operation, which weakened the patient so much, that we apprehended a fatal termination of the case during the night.

31st, 8 A. M. The patient passed the night until 2 A. M. in the same state; but at this time he appeared to rally a little, and became more quiet and less comatose. He continued to recover until now, when he appears very collected and rational, answering questions distinctly, and describing his situation without being forced to do so. He says he has no pain, except about the right hypochondrium, and that his head is perfectly easy; the cheeks are suffused, of a reddish-brown colour; cough occasionally, and gets up the *sputa* with ease; they are still vitreous, viscid, frothy, of a brown colour; tongue brown, furred, chopped, dry; much thirst; some appetite; no evacuation since yesterday morning; abdomen a little tumid, not tender; breathing natural in upper right side anteriorly, but from the nipple downwards, it is obstructed, and mixed with crepitous, subcrepitant, and mucous râles. On the back it is distinctly bronchial, and clear bronchophony was detected on the side, and along the lower spine. The left lung appears unaffected. The wound discharges bloody sanies. The pulse is soft, calm, not nearly so quick; skin cool. *Rep. pil. Ungt. et Ol. Ricini.* A little rice and milk.

Vespere. Passed the day very easily; two evacuations; slight nausea; has vomited once or twice during the day; head very easy; countenance less comatose; cheeks not so flushed. Complains again of occasional violent stitches in the right side, which he says prevent him from coughing. The *sputa* are muco-purulent. Breathing tolerably easy; no rigor, nor tendency to perspiration; pulse quick, soft, not very full; skin moderately warm. Was cupped on the side to the extent of six ounces, which produced very considerable weakness and falling of the pulse.—*Vesicat. lateri sinistro; rep. Calomel. et inunctio.*

Feb. 1st. Passed the night well; blister has vesicated slightly; has no pain at all this morning, but complains that he has difficulty in coughing; breathing easy; face flushed; pulse 98, moderately full, soft; wound continues to discharge purulent matter tinged with blood; head quite easy; *decubitus* on back; expectoration as formerly, the muco-purulent sputa having disappeared; condition of the lung as before, except that the breathing anteriorly is obscure—in consequence, probably, of some pleuritic effusion.—*Mist. expectorans.*

Vespere. Very easy; pulse quick, less rapid; expectorates easily; has no pain; bowels moved once since morning.—*Cont.*

2d. Passed the night pretty well, but was frequently raving and delirious; nearly in the same state this morning as at last report; pulse 90, full; skin warm; wound discharging purulent matter; bowels moved once or twice during the night. Slight crepitus about the anterior lower right lobe; hepatization complete along the back lung, up to the middle of the scapula; cough much easier; expectoration as before; frothy.—*Cont.*

Vespere. Has been easy all day; pulse a little full to-night; no cough nor dyspnœa; decubitus on back; bowels moved during the day.

3d. Passed an unquiet night, but is again calm and easy this morning. Reported to have had frequent rigors during the night; skin moist, less warm; sputa again muco-purulent, less copious, not frothy; pulse 98; pretty full, without force; bowels free; wound granulating. The moist state of the surface prevented an examination of the chest.—*Omit. pilulæ.*

4th. Passed a good night, and is much better this morning. Cough much easier; expectoration scanty, frothy, slightly muco-purulent; pulse 100, soft; skin moderately warm; no rigors; bowels regular; head very easy.—*Mistura Expectorans.*

Vespere. Much better in every respect; pulse 100; passed the day very quietly; was lively, and in better condition altogether than he has been yet; no pain; perspired a little; cough very easy, loose.

5th. Another good night, and is very easy this morning. Wound discharges good matter; coughs very little; expectoration scanty, again viscid, very frothy, of a light yellow colour; countenance lively, less flushed; bowels regular; thirst; tongue brown, furred, less dry; no sordes; mucous and subcrepitant râles on both sides of chest anteriorly.

Vespere. Considerably worse to-night; was attacked during the forenoon while at stool with violent rigors, attended with dyspnœa so urgent that the patient believed he would never breathe again. He got into bed with some difficulty, and had several shivering fits afterwards. Is easier again to-night; face flushed; pulse 130, small; skin very warm; thirst; can lie only on the back, and states that he could not breathe at all if he turned on either side.

6th. Passed a bad night, but is better again this morning. Copious perspiration; slight rigors during the night; pulse soft, still rapid; bowels once evacuated; tongue moist, clean; less thirst; cough easy; expectoration very frothy, viscid, glairy, slightly tinged with yellow; white sediment in the urine; wound looking well; decubitus only on the back. The chest could not be examined, owing to the state of the surface.

Vespere. Immense oppression; dyspnœa intense; breathing hurried and very short; pulse not to be counted, very small; much pain on both sides of chest; distinct crepitus in left mammary region, and large mucous râles in the lower third of the same side; breathing of right mamma puerile, unmixed; head undisturbed; earnestly requests a draught to make him sleep.—*Hab. Tinct. Opii. gts. xl.*

7th. Sinking rapidly; pulse small, slow, and feeble; breathing very rapid; the motion of the chest is very great, as it were forcible; but the ribs do not move individually. Subcrepitant râles in upper left mammary region. No cough nor expectoration; says he has no strength to cough; face of a brownish red colour; skin moist, warm; has pain all over the chest, so much so, that he cannot bear the pressure of the stethoscope. He slept none during the night, and was slightly delirious. He has turned on his left side, and says he has most ease in that position.

Vespere. Moribund; great dyspnœa and jactitation; has coughed none since morning; less pain; quite rational; pulse intermitting, small, very slow; face suffused, brown.

8th. Expired at 4 A. M. perfectly rational, but in great agony.

Autopsy.—8th Feb. Slight emaciation; dull sound on percussion of lower right side; upper portion sounded clear; left side, except in its lower portion, afforded generally a diminished resonance.

Head.—No fracture nor depression of bone; two slight scratches on the external aspect, parallel to the incised wound. Skull-cap very adherent to the *dura mater*, which was unaltered in colour and consistence throughout. Considerable turgidity of the sinuses and superficial vessels; the other two membranes perfectly normal. Medullary substance rather redder than usual, presenting, when cut through, numerous bloody points. Lateral ventricles destitute of serosity; *plexus choroides* blanched; no effusion in any part of the cavity.

Thorax.—Much serosity in the right pleural sac, clear as it escaped by the incisions; but turbid, thick, of a purulent colour, between the lungs and ribs, occasioned, probably, by intermixture with the *flocculi* of false membrane, with which the lung was thickly coated. The layers of this latter substance were very soft, like butter, of a pale yellow colour, and readily reduced to a pulp by pressing it between the fingers. The lung was pressed up against the spine by the effused fluid, but it reached its full extent lengthways. The lower lobe, more thickly covered than the others by the false membrane, was throughout perfectly hepatized (carnified, Laennec,) the parenchyma presenting small round dots of purulent matter. It did not present a granulated aspect when cut through, the incised portions being smooth, of a dark-red colour, allowing a bloody, unfrothy serum to exude from it when pressed. The posterior parts of the other two lobes were hepatized; the anterior portion of the middle was much engorged, but crepitous; the corresponding part of the other only slightly infiltrated. No exudation in the left pleural sac. The lung was gorged in the back and lateral portions with black liquid blood, and no part of it was hepatized.

The pericardium was throughout nearly one-fourth of an inch in thickness from successive depositions of very consistent false membrane, the surfaces of which were highly vascular, when exposed by separating the one from the other. The inner surface of the proper membrane was very vascular, from numerous large and small vessels shooting through its whole extent. It presented, however, no stellated nor detached patches of vascularity.

The roots of the large vessels were buried in the membranous exudation, which could only be removed by considerable force. The external surface of the heart was covered completely with soft false membranes, their outer aspect presenting numerous papillæ, like the reticulations of a sponge when torn. On removing the exudations, the lining tunic was found of a leaden colour, without a trace of vascularity. It appeared, when cut through, much thickened, of a whitish blue colour, with a layer of membranous deposit between it and the muscular substance. This latter was pale, of a slightly bluish tinge. The thoracic cavity was certainly small, occasioned by the encroachment of the liver, which was found greatly enlarged.

Abdomen.—Stomach distended. It presented, on the mucous membrane of its smaller curvature, a large spot of a general dark colour, with some very black patches. The membrane here was softened to such a degree, that the least brush of the sponge peeled it off in stripes; but, beyond what might be termed the line of demarcation between this and the sound portions, the mucous tissue resisted the sponge and the scraping of the nail. The line of demarcation was as well defined as I have ever noticed in gangrenous limbs. The pyloric extremity, and three or four inches of the duodenum, were deprived of their lining tissue, either by ulceration or abrasion; and the muscular coat was exposed, and of a highly vascular appearance. The ileon presented many patches of its mucous tissue of a bright red colour, and the colon at its lower end was much contracted in calibre.

Observations.—Several surgical writers have pointed out the fact, that pneumonia frequently supervenes to wounds, and the larger surgical operations; and it has also been stated, that, under such circumstances, the pneumonia is rarely attended by its usual symptoms, but appears under the form which is termed *latent.* It will be seen that the case now detailed belongs to such examples, although the dependence of the inflammation of the lungs on the wound of the head is far from being apparent. As, however, one of the immediate consequences of this injury was a state of great general excitement, it is but fair to infer, that all the viscera were in a condition to receive readily morbid impressions, from any exciting cause of disease to which they might have been exposed. The exhibition of the purgative and the saline mixture at the commencement of the case produced effects on the *primæ viæ* readily traceable to the conjoint operation of these causes; and it is possible that the pulmonary disease was developed in the same way, although its exciting cause is far from being so evident. Be this as it may, the insidious manner in which it commenced, entitles it truly to be considered *latent*, and merits, from the important consequences to which it leads, ample attention.

It is a difficult matter to point out the exact time at which, it might be said, the pulmonary disease originated;—for there were no symptoms discovered that can be referred exclusively to this lesion, until the disease had advanced to its second stage. It is only necessary to refer to the report of the case to see that, with the exception of some dry cough, and occasional stitches in the side, no unambiguous pulmonary symptom appeared until the evening of the 29th, when the loss of resonance and the bronchial whiffing, detected at the same time, indicate that the lung had become hepatized. Even after this period, the progress of the case was very different from the general examples of pneumonia; for, although the *sputa* had become characteristic of the disease, its essential features were so completely obscured, that the whole phenomena of the case were attributed, by a surgeon of long standing, and high professional character, solely to supposed disorganization of the brain or its membranes. It is important, also, to observe, that the aggregate of the pulmonary symptoms, presented from the commencement of the case, to the setting in of the violent phenomena exhibited at its close, is considerably less striking than what is daily met with in cases in which not a tithe of disorganization, equal to that produced in the present, has taken place. This fact becomes apparent by seeing that some cough, with rusty-tinged vitreous *sputa*, slight hurry of respiration, and occasional stitches in the side, compose all the pulmonary phenomena that appeared in the case. No one can hesitate to affirm, that ordinary cases of pneumonia are much more strongly marked.

It is very true, that, as the lung becomes hepatized, and especially when a copious pleuritic effusion is coexistent, it is usual in this disease to see a great diminution of prominent symptoms. The patients certainly appear to be greatly easier, and in a less precarious situation; but in all such cases the relief obtained is preceded by violent disturbance of the vital functions; while, in the present, it cannot be said that, until hepatization had taken place, there was any thing to make us believe the disease existed at all. In no way, then, was it a well-marked case of pneumonia; and I question much if it would have been recognized as such before death, but for the phenomena detected by auscultation. It is almost needless to add, that this fact shows the necessity of practising such means of diagnosis, under every circumstance, in which we have the slightest reason for suspecting the lungs to be affected.

The gastro-enteric disease developed in the case is well worthy of attention, and, it is far from unlikely, had some share in modifying the features of the pneumonia. It is observed, in most cases, when disease exists in two or more important apparatuses, either that the symptoms of one of them are entirely masked by the intensity of those of the other, or that a remarkable modification of both takes place, so as to render it nearly impossible to say which of the two appears to predominate. The latter case, however, is comparatively rare; for, in nearly all the instances of such complications, we generally find periods of alternation, in which we are enabled to discover that the intensity of the one lesion is effected, as it were, at the expence of the other,—from the symptoms appearing by turns to result solely from the disturbance of one of the functions engaged. The present case, however, is clearly due to the rarer variety, for it is impossible to point out, except at its commencement, when we can scarcely believe the pulmonary disease existed, any period at which there was a decided predominance either of gastric or pulmonary phenomena. Of course, we must except also the period near its termination, when there supervened the lesion of another organ, which completely obscured all traces of the others.

The gastro-enteric and pulmonary lesions, then, appeared to proceed *pari passu*, and the proper symptoms of each to suffer mutual modification. With all this, however, it is easy to point out, as has been done with the pulmonary, the symptoms which are due to the gastro-enteric phlogosis; and these we may separate into such as are unambiguous, and such as may be reckoned dubious. Under the first head, come, of course, the abdominal pains, the occasional diarrhœa and nausea, the thirst and anorexia; concerning all of which it is needless to say any thing further. The other involves some important questions, which the limits of this summary will not permit being fully discussed. It must be said, however, that there is reason to consider the comatose prostration, and the occasional delirium, evinced during the greater period of the progress of the case, due to this lesion, as some of its secondary or sympathetic effects. It is very true that such symptoms are often observed in uncomplicated cases of pneumonia; coma and delirium being usually mentioned as consequences of the disease. Yet it is also to be borne in mind, that such phenomena are observed only along with the most formidable pathognomonic symptoms of the disease, and are rarely found alternating with periods of perfect sensibility; but appearing only near the termination of the disease, almost invariably indicating this to be fatal. It is hardly necessary to show how very different from all this were the phenomena in the present case. The delirium was confined to the night, disappearing always in the morning; the coma was never complete, but was only a higher degree of torpor, from which the patient could always be roused; it declined towards the termination of the case, and the patient expired in the full possession of consciousness and sensibility. They approached in all these particulars to a condition frequently observed in gastro-enteric fevers; and it is material to bear in mind, that there were exhibited other symptoms which we are daily in the habit of meeting in such cases.

The dry, chopped, or furred state of the tongue, the softness and rapidity of the pulse, the great loss of strength and prostration, and the inability to bear even moderate evacuations of blood, all contributed to give the case what is termed the *typhoïd aspect*, so generally characteristic of gastro-enteric fevers. How far the lesion of this apparatus operated in the production of these phenomena must remain a debateable point; such a complication with pneumonia, constituting, it has been lately said, the anatomical character of the variety termed bilious, has been often observed attended by a typhoid condition; but, as this consequence is far from being invariable, it cannot be affirmed, in the present case, to be unequivocally due to the lesion in question. How far both lesions operated in lowering the nervous energy to that degree which permits the developement of this condition, is another and distinct question, which cannot be farther commented on here.

The only point in the case which remains to be considered is the inflammation of the *pericardium*. This lesion appears indicated by strong features; yet I must confess candidly, I did not recognize its existence until after the death of the patient. It is evident now, however, what symptoms were produced by it, and some of them are so characteristic as to merit being included among the pathognomonic phenomena of the disease. In particular, we must consider as such the acute pain felt over the region of the heart, and increased by pressure; the great anxiety and frightful dyspnœa, coupled with this pain, are no less conclusive. The bloated, turgid state of the features is also a prominent phenomenon, and no less so the constrained *decubitus*, the rapid motion of the circulation, and the jactitation observed towards the close of the case. All this assemblage of symptoms would no doubt have been less easily discriminated, had there not existed previous to this developement a considerable amelioration in the condition of the patient, and, consequently, an absence of other prominent phenomena; but it is in this way, generally speaking, that the disease is ushered in. The supervention, then, of these formidable symptoms on a state of comparative ease, is a circumstance that merits a first place in the summary of the symptoms of the case. It is worthy of recollecting, that the patient, for three or four days previous to that on which death took place, could only rest on the back,—the least attempt to turn on either side being followed by insupportable distress; yet we have seen on the day the case proved fatal, and the disease had reached its greatest intensity, that the patient turned on his left side, and felt ease only in that position. Now, impracticability of decubitus on the left side has been long considered a pathognomonic symptom of *pericarditis.* The pulse also in this case presented remarkable variations, differing in some degree from what is generally received as characteristic of the disease. At the commencement of the attack, it was so rapid as to defy its being counted; it then became slow, small, and feeble; and finally, but not until a few hours before death, it was found intermitting. The stethoscopic phenomena of the disease were necessarily not ascertained, as the extreme tenderness of the cardiac region prevented the patient bearing the weight of the instrument.

CASE 2.—*Gangrene of the Lung and Pericarditis.* Private Thomas Dean, 32d Regiment, aged 22, admitted 19th April 1833. Limerick.—21st April. Was under treatment lately in hospital for dysentery, and was discharged before he was quite well, in consequence of the crowded state of the wards. He contracted a diarrhœa, which he neglected for some days, and was admitted for it on the morning of the 19th. During the evening of that day the evacuations became serous, and vomiting of all ingesta supervened; complete collapse took place, but he retained some heat about the trunk and the lower extremities. The pulse was absent from the wrist for at least twenty-four hours. There were no cramps. The treatment was confined to the camphor drops, (a remedy adopted in Limerick at this time for the cholera,) with cold drinks, sinapisms, astringent enemata, and small doses of calomel and opium.

Last night, that is, the 20th April, the pulse returned feebly to the wrist, and is now well developed. There is much turgidity of *conjunctivae;* great prostration; thirst, with anorexia, and irritability of stomach; the tongue red at the tip, and loaded; the voice much depressed, and whispering; deep-seated pain was felt at the epigastrium; there was no headach; heat general, except at the hands and wrists, where it is deficient; and from the bowels were evacuated three times last night stools tinged green. *Hirud.* xij. *epigast.* Cold lemonade.

22d. Leeches bled pretty well. On the whole better, though still greatly depressed; with anorexia, thirst, and slight irritability of stomach; mouth affected by the calomel; bowels constipated; no pain of abdomen; pulse soft, full, not above 80; skin moderately warm; eyes very turgid; face flushed. An epispastic was applied last night to the *scrobiculus cordis*, but it has not acted. *Rep. Epispast. Gargar. Astring. Emulsio Ol. Ricini.*

23d. The bowels were not moved last night until an emetic tartar injection was given, when three scanty evacuations were procured, and they continue sluggish; the tongue and teeth are covered with dirty-brown sordes; the face is red and bloated; and the eyes are much injected; the gums and throat very sore from the mercurial action; thirst abated; stomach retentive; much anorexia; refused to take some beef-tea offered him yesterday; no headach nor other pains; abdomen not tumid, bearing firm pressure; pulse soft and calm, not above 70; skin moderately warm.—*Enema Ol. Tiglii.*

24th. The injection produced five feculent motions. Eight leeches were applied last night to the epigastrium, which bled freely. He appears this morning worse in every respect, but complains only of violent pain in the lower region of the left side of the chest, and a sense of great oppression; much anxiety; breathing hurried; much pain under the angle of the left jaw, where the several enlarged glands are felt; slight difficulty of deglutition; the teeth are coated with dirty-brown sordes, and there is much fœtor from the breath. The head is easy; the face turgid; the eyes red; the thirst intense; skin warm; pulse moderately full, a little quick, but readily compressible. He is inclined constantly to throw off the bed-clothes from the chest and belly; no cough nor expectoration; but he says he would be easier if he could spit up. There is much tenderness over the epigastrium and right hypochondrium, but neither tumour nor hardness; less irritability of stomach, fluids being retained. The action of the heart to the hand is considerable; but the stethoscope discovers neither increase of impulse, nor irregularity in the sounds. Full examination of the chest discovered nothing but slight circumscribed crepitus under the left nipple laterally. An attempt was made to take some blood from the arm, but it failed,—a small quantity of dark-coloured thick blood being all that could be obtained. *Hirud.* xij. *epigast. et hypochond. sinistro.* Cold lemonade.

Vespere. Leeches bled profusely; pain much relieved, and he appears generally better; has been frequently sponged during the day with cold vinegar and water; still complains of pain in lower region of the left side of the chest; pulse 100, fuller, but still soft; some moisture on the surface; bowels confined all day; swallows with ease. Experiences on full inspiration a pain stretching from the epigastrium along the sternum, as high up as the throat; breathing attended by a wheezing sound.

25th. Passed an indifferent night, and awoke several times, apparently much terrified at some imaginary objects. This morning appears quieter, and says he feels much better; throat easy, but he still complains of the pain referred to the jaw; upper abdomen cool, bearing pressure throughout; breathing less noisy; stomach retentive; immense thirst; tongue very red at tip, apparently with a brown fur at the base; but he can only protrude it a short distance, as he has much pain at its root; cheeks with a dark-red suffusion; teeth still coated, but less so than formerly; pulse about 98, soft; heat irregularly distributed; head easy; bowels constipated; no tumidity; requests some nourishment.—*Emulsio Ol. Ricini;* a little rice and milk; *Hirud. jugulo.*

Vespere. Leeches bled freely; no apparent relief to the general or local symptoms; makes no complaint but of his throat, which presents under the angle of the left jaw an immense firm tumour, which is acutely tender to the touch; moans incessantly, and is greatly depressed; pulse a little softer, but still quick; no evacuation of the bowels; eyes turned up.—*Rep. Emulsio, Enemata Emol.*

26th. Passed a very good night; sleeping a great deal; bowels freely moved without the injection; complains only of anorexia; complexion less suffused, and he appears altogether better; pulse 104, soft; heat moderate; continues to throw the bed-clothes off the trunk; no headach; swelling of jaw increased, but it is softer, without fluctuation; teeth cleaner; tongue still red.—*Rep. Aspersio, cataplas. et Emul. jugulo.*

27th. Had four grains of *Ext. Hyoscyam.* last night, which produced sleep; appears better this morning, though still much depressed; pulse quicker, but not more full or hard; complains only of his jaw and want of appetite; abdomen flaccid; bears firm pressure; has still difficulty in protruding the tongue, which is still red at the tip and coated beyond; face less flushed, head easy; skin cool; bowels again confined; slight irritability of stomach this morning, after taking a little chicken-broth.—An emulsion, with two-thirds of a glass of wine for dinner. *Rep. alia.*

28th. Passed a pretty good night, and remains nearly in the same condition as yesterday; still much depression; pulse 98, full, but not hard. Considerable excitement followed the use of the emulsion yesterday, but he has not suffered, apparently, from its having been repeated this morning; complains of much soreness all over the chest, which is increased by pressure or motion; respiratory murmur well developed throughout, but there is slight loss of resonance in anterior lower right side, from the nipple downwards; bowels still constipated; no nausea; appetite very bad; the swelling is very soft; an attempt made to evacuate its contents, by plunging a lancet deep into its substance, but no matter escaped.

30th. Has sunk much since last report, but chiefly since last night, and is now in a state of extreme prostration and weakness; complains only of his jaws and abdomen; a swelling has appeared under the angle of the right jaw, similar to that existing under the other; continues to uncover the abdomen; pulse 110, feeble and soft; skin dry and harsh, with some heat; bowels opened by the emulsion; vomited to-day a quantity of matter of shreddy consistence, like false membrane; intense fetor from breath; teeth still covered with dirty sordes. A small quantity of wine was given him this morning by one of the medical officers of the garrison, and which, he says, scalded his mouth and throat; complete anorexia.

May 1st. The treatment adopted yesterday consisted of bark and beef-tea enemata, with some emulsion, to which a little wine was added; it was followed last night by an aggravation of all the symptoms, but he appears this morning nearly in his usual condition, although he complains more of the abdomen; the epigastrium and left hypochondrium are very tender to the touch, and he has more inclination to uncover the trunk; pulse 110; probably a little harder; the fetor of the breath is intolerable, and he is spitting considerable quantities of light-coloured purulent matter, of an offensive smell. The anterior parts of the chest examined by the stethoscope, but nothing abnormal detected; bowels again confined.

2d. Passed a bad night, but appears rather better this morning; is less torpid; still complains greatly of the abdomen; bowels moved two or three times since yesterday afternoon; pulse 100, less hard, but not feeble; some headach; eyes less injected: profound anorexia; tumour as before; continues to spit purulent matter; and the breath is very fetid.

4th. Was attacked with diarrhœa on the evening of the 2d, which yesterday became complicated with violent pain of abdomen and tenesmus; there was both last night and the preceding a distinct accession, although the prostration and debility were very great; every thing was done to give relief to the violent pain of the bowels, but without effect. Last night his suffering from this was extreme, and he expired under it at three o'clock this morning, in the full possession of intellect.

Autopsy. 4th May. Considerable emaciation. Thorax sounded dull on the right side from nipple downwards. Lungs voluminous. The right presented the two upper lobes of their natural colour, but the lower was of a blackish-brown, studded here and there with some white raised spots; it retained the impression of the finger. This lobe, on being cut into, emitted a most insupportable gangrenous fetor; it was found throughout of a general dark-brown colour, with blackish spots, and plentifully interspersed with patches of purulent matter; some large like suppurated tubercles, others like minute dots of purulent matter. A few small cavities were also found; some appeared to have contained purulent matter; while one, narrow and round, had been evidently filled with a black fluid. The substance of this lobe had entirely lost its cellular nature, and become hepatized to a certain degree, without presenting the firmness peculiar to this condition. It was, on the contrary, soft, very friable, and granular; the slightest pressure of the finger breaking it down to a pultaceous mass, and causing to exude a reddish-yellow fetid sanies. The lower lobe of the left lung presented the same colour, smell and consistence, as observed in the right, without any trace of purulent matter. No serosity nor false membrane was found in either cavity.

The pericardium and lining tunic of the heart presented evidence of extensive inflammatory action, being covered with small, shreddy, dirty-white false membranes,—some of which had joined the tunics together over the left auricle, and upper part of the corresponding ventricle. The adhesion, however, separated immediately on the pericardium being allowed to hang down. The proper membrane of the heart was slightly thickened, and presented a membranous exudation under its muscular surface. The heart was softened, and tore very easily.

Abdomen. All the hollow viscera presented a remarkable dryness, and glistening appearance. The stomach was very large; its mucous tissue was slightly hypertrophied and firm, of a dirty light red colour, with dark yellow patches, and studded all over with small holes, as if it had been pricked with the point of a pin; and the muscular coat was highly vascular. The small intestines, particularly the *valvulæ conniventes* of the *duodenum* and *jejunum*, presented intense vascularity in many parts; and the lower end of the *ileon* was of a deep red colour, from complete engorgement of its capillaries. The tunics of the right division of the colon were greatly attenuated, and its mucous membrane had a dark-red colour, as if it had been steeped in a decoction of logwood. The descending flexure afforded also many parts highly vascular.

The swellings in the neck had proceeded from inflammatory tumefaction of the parotid and submaxillary glands,—their interstitial cellular substance being completely infiltrated with purulent matter.

Observations. The typhoid condition was very strongly marked in this case from its commencement, and we find here, as in the preceding, important lesions of the pulmonary and abdominal viscera. Yet the cases differ from each other, no less in their features and progress, than in this, that in the present the typhoid condition appeared to precede the lesions of these organs, while in the other it was associated with their developement.

We may conclude, without passing the limits of sound induction, that the severe dysentery under which the present patient had laboured, prior to his last admission into hospital, added to the effects of the formidable disease that attacked him immediately after this period, all tended to reduce him to a state in which depression of the nervous energy must have been conspicuous. Nay, this conclusion is amply supported by the phenomena which the case presented. The general character of these phenomena is without doubt best explained on this supposition of depression in the innervation of the patient; yet I think we are bound not to overlook another circumstance in the case, which we have reason to infer may have had considerable influence in the production of some other of its phenomena. I mean the mercurialization of the system, that was effected during the progress of the cholera. It cannot be doubted that, in some particular constitutions, the action of mercury on the system is attended by certain results, to which some of the features observed in this case bear a close resemblance; and although we cannot point out any characters by which such constitutions are distinguished, nor explain very readily, the peculiar manner in which mercury produces the effects, we should be very cautious in denying it to have had influence in this way, when we find its specific consequences attended with the phenomena mentioned. These observations are made, not from considering the question to have been clearly established, that mercury at times produces certain changes in the fluids, but simply to show that the present case offers something analogous to what has been taken as the ground-work of the theory adverted to. I may only observe, that, since I met with this case, I have seen another, in which nearly the same circumstances were present.

It may be seen from the preceding remarks I am anxious to show, that, in addition to the *typhoid* (adynamic) condition so clearly marked in the present case, and depending on the state of the innervation of the patient, there is some reason to believe an alteration had taken place also in the hæmatosis; and it is important to bear in mind all the circumstances favouring this supposition, when it is attempted to account for the gangrene of the lung that forms so prominent a feature in the lesion detected at the dissection. In the meantime it is only required to state, that, however decided these conditions may be allowed to have been, we are fairly justified in supposing they preceded the developement of the organic lesions.

Of all these lesions the most important is certainly the abdominal, and we find here the reverse of that noticed in the preceding case,—namely, that the violence of its symptoms completely obscured all those of the thoracic. It is impossible from this circumstance to point out the exact time at which the latter originated, and I question much if it is not accounted a waste of time to attempt it.

On referring to the report, it will be seen, that, on the 24th, some symptoms appeared, which one might consider depended on phlogosis of some of the thoracic viscera; yet they cannot be pronounced unequivocally due to such a cause. Their assemblage is by no means striking, nor do they differ much from phenomena which we are certain often result merely from sympathetic disturbance of the functions. They were considered as such at the time, and there appears not much now to warrant a different opinion. It is very true that some of them, as the pain, were referred at that time to the same situation which we have since discovered to have been the seat of an important lesion; but are we warranted from this in fixing the commencement of the pericarditis at this date? It may be said, that, if not here, there is no other period at which there occurred any symptom to indicate its presence at all, and that we cannot believe the lesion would occur without producing some effects more or less characteristic of its developement. Let it not be overlooked, however, that, even granting all this, we do not get rid of the difficulties of the question, but positively encumber it with others; for we cannot either understand how the local bleeding could subdue the inflammation so completely as to cause its symptoms to disappear, or how such disorganization of so important an organ could be compatible with the continuance of life, even for the limited number of days that intervened between the supposed date of the origin of the disease and the death of the patient. In fact, the whole subject is involved in such obscurity, that it appears tó me the present case may be added to others, sufficiently authentic, on record, in which inflammation of the pericardium has been detected after death, without its existence during life-time having been pointed out by any of its characteristic symptoms.

With regard to the affection of the lungs, an important point has to be determined as to the condition that may be supposed to have preceded the gangrene; was it inflammatory or otherwise? Judging from the symptoms, the question would be answered in the negative; but, from having seen how very undecided were those produced by the pericarditis, we have less reason to consider them as essential in determining the character of the lesion of the lungs. Yet there was not a complete absence of pulmonary phenomena; for, on the 28th, the patient complained of general soreness of the chest, and percussion elicited a dull sound over its lower right portion. It is deserving of attention, also, that these phenomena were detected the day preceding that on which, we have every reason to believe, the gangrene was developed. But it is not alone on the symptoms we must depend in investigating the subject; for the actual condition of the lungs must also be taken into account. It is mentioned in the dissection report, that the lower right lobe especially had acquired a degree of firmness and density approaching to hepatization; its structure had become in a measure granular, and no air was evolved on pressing parts of it between the fingers. Certainly the hepatization was not complete, but it was sufficiently considerable to prove that the lung had undergone a change remarkably different from that of mere engorgement. Besides, we cannot consider this degree of firmness to have been dependent on the gangrene; for, in all instances where this lesion occurs as a primary effect of passive engorgement, the portions of the lung are found remarkably softened, so much so in many cases as to be resolved into a putrid *deliquium*. Everything, then, tends to show that a degree of inflammation existed in the lung prior to the developement of the gangrene; and, to account for the latter following it so quickly, we must take into consideration the peculiar condition of the patient, already referred to, with regard to innervation and hæmatosis. In individuals placed under similar circumstances, we find such a tendency of inflammations to terminate in gangrene, that this is accounted one of their distinguishing features. It is not that in such cases inflammations are very apt to reach that intensity which we see often favouring the developement of gangrene, but that every congestion of blood which takes place in any of these tissues, no matter from what cause, is exceedingly liable to lead to this result. Let this suffice, then, to show, that, in the present case, a violent inflammation of the lungs need not be assumed to have been necessary for the production of the gangrene, as we have every reason to infer, that any *hyperæmia*, however trifling, may have led to it from the particular circumstances under which the patient was placed.

The distinguishing symptoms of the gangrene were well marked, and they were sufficient nearly to have established its diagnosis, even without its physical signs having been detected. It need scarcely be mentioned that I allude to the intolerable fetor from the breath, and the peculiar coloured fetid expectoration. The latter, however, it will probably be admitted, was very likely to have been considered as connected, in some way, with the tumefaction and suppuration of the submaxillary glands; and such, I confess, was the opinion entertained, before the death of the patient. We cannot fail to see now, however, that it depended on the disorganization of the pulmonary tissue; yet it may be as well to bear in mind, as a guide for future observation, the source of fallacy which prevented it from being recognized as such in the present case.

There is nothing farther strikes me to demand observation, but the purulent deposition met with in the right lung. In no work, with which I am acquainted, is this appearance described as an attendant on gangrene of the lung; there is, therefore, little reason to consider it as the effect of this in the present instance. Nor does there appear anything to induce us to believe it was a consequence of the inflammation, for it differed completely from all the forms of suppuration to which the lung is liable. The most likely explanation appears to be, that the purulent matter was deposited in the lung from the circulation into which it had been carried by absorption, from the suppurating glands in the neck; and there are not wanting cases on record to prove that this series of phenomena is far from uncommon.

Waterford, September 5, 1834.

ART. III.—*Cases illustrative of the Pathology of Purpura Hemorrhagica, Rabies, and Chorea.* By JAMES KEIR, M.D. P.A. Moscow, in a letter to Dr CRAIGIE, Edinburgh.

I.—*Two Cases of Purpura Hemorrhagica, one connected apparently with internal organic disease.*

I AM induced to send you the following case of *Purpura Haemorrhagica* for insertion in the Edinburgh Medical and Surgical Journal, from its differing in some respects, and particularly in one very essential circumstance, from any case I have yet found recorded, and from the conviction, that it is only by the comparison of cases carefully observed and faithfully detailed by different practitioners, that there is any probability of our ever being able to explain the pathology of diseases like this, confessedly obscure. The circumstance to which I particularly allude, was the probability, in as far as could be learned by the patient's history of his complaint, compared with his actual state, that the disease had begun in the heart itself, whose natural action was evidently much deranged, and its structure probably diseased.

Several writers have alluded to disease of the abdominal viscera, particularly of the liver and spleen, as connected with *purpura;* and Dr Bateman, in his Synopsis of Cutaneous Diseases, p. 112–13, fourth edition, mentions that a case of " a large morbid growth, consisting of a fleshy tumour, with a hard cartilaginous nucleus, weighing about half a pound, was found in the situation of the thymus gland, firmly attached to the sternum, clavicle, pericardium, and surrounding parts."

In the following case, beside the disease of the heart, the liver was evidently swelled, and in a state of congestive inflammatory irritation, and the spleen was hardened and enlarged. I need hardly add, that the case terminated fatally, but regret exceedingly that I was not permitted to examine the dead body.

Ivan Petroff, a silversmith, aged 19, of sanguine temperament, tall, and of slender make, was admitted a patient into Sheremetieff's Hospital on the 1–12th of September 1833. He gives the following account of his complaint; he began to feel himself unwell last July, when the first symptoms were, uneasiness, and pulsation in the chest, particularly about the region of the heart; towards the end of August, he was affected with epistaxis, which he says was severe; about four weeks ago, he began to feel uneasiness in the epigastrium and hypochondria, and about three weeks ago, the purple spots with which he is affected began to appear first on the arms, and afterwards on other parts of the body.

The present symptoms are, strong pulsation of the heart, felt and seen about the intercostal space, between the middle of the fifth and sixth ribs; when the stethoscope is applied, the pulsation is strongly communicated to the ear, and the instrument lifted up by the stroke, but no particular sound accompanies it,—there is no apparent swelling of these parts; the pulse at the wrist beats 116 in the minute, and though not full nor strong, is somewhat sharp. The epigastrium and hypochondria are swelled and distended, and the right, particularly, is painful to the touch; the liver appears to be swelled, and the spleen is felt to be hard and enlarged; his complexion is naturally fair, but has a slight pale bilious tinge. Purple petechiæ of the shade of ordinary red Bordeaux wine, pretty closely set, the largest not exceeding the size of a large pin's head, are observed in different parts of the body, particularly about the inside of the fore-arms, and on the buttocks; his tongue is clean, and rather moist than dry; he bleeds from the nose occasionally, and there is some slight oozing of blood from the gums of the lower jaw, but no appearance of scurvy, or disease of the gums; the bowels, by account, do not appear to be quite free; the breathing is not easy.

The surgeon who had charge of the patient prescribed, *Elixir Acidi Halleri*, ʒi. gtt. x. *pro dosi ex aqua.*

2d. He ordered *Cort. Cinchonæ*, ʒi. *coque cum. q. s. Aquæ ad colaturæ* ℥vi.; *adde Acidi Sulphurici, diluti* ʒi. *M. Omni hora* ℥ss. *pro dosi.*

Same day I ordered, *Hirudines* xii. *ad epigastrium, hypo-*

chondrium dextrum, et circa anum applicandas. Calomel. gr. iij. *Pulv. Rhei,* ʒss., *cum mucilag. gummi Acaciæ Arabicæ, fiant Pilulæ* vi., *capiend. pro dosi ad noctem.* Thin and spare diet.

3d. Bowels have been opened by the pills ; stools sufficiently copious, and not unnatural in appearance ; feels relieved ; a little cogulated blood is still discharged from the nose from time to time ; pulse 116 in the minute, and is still somewhat sharp ; pulsation of the heart strong.

4th. *Omit. decoctum Cinchonæ pro tempore.*

℞. *Calomel. Pulv. Rad. Ipecacuan. Pulv. Fol. Digitalis Purpur. aa.* gr. iij. *Pulv. Sacchari albi,* gr. xii. *M. et divide in doses* vi. *unam ter in die ex Theriaca sumend. Mist. Salinæ,* ℥vii. *Spt. Æth. Nitrosi,* ʒi. *M. Cochlearia mensalia duo misturæ sumat, omni bihorio.*

5th. Less irritation in the pulse, and otherwise continues better.

6th. Continues easier. The pulsation, however, of the heart is still very strong, and action of the radial artery not synchronous with the beat of the heart ; pulse at the wrist 112, and still sharp, not very full ; bowels discharged two bilious-looking stools ; urine, formerly scanty, has increased to about three pounds in twenty-four hours ; it is rather bilious-looking, and dark-coloured ; has been quiet during night ; no discharge of blood ; colour of petechiæ less vivid ; heat of the skin moderate ; no pain any where.

7th. Has lost about four ounces of blood from the nose since yesterday ; pain about the right hypochondrium and epigastrium diminished ; bowels open ; excrement liquid, and dark-coloured, probably from blood ; pulse 104, of nearly the same strength as yesterday ; urine rather scanty, and of a deep brownish-yellow colour.

9th. Has lost about two ounces of blood since yesterday ; pulse 112, again sharper than it has been these last days ; he makes no complaint ; pulsation of the heart strong, but he does not complain of being incommoded by it.

10th. Pulse has risen to 124 ; it is still sharp, though not so strongly so as yesterday ; pulsation of the carotids and at both fossæ above the clavicles strong, and evident to the eye. Petechiæ about the buttocks and legs have disappeared,—are only now to be seen about the arms, where their former dark purple colour also is much faded ; an eruption of another kind has shown itself since last night on the face, in the form of red round spots, something like the measles, but larger. He has all along had a trifling cough, and it is not now increased ; no pain of chest or difficulty of breathing.

11th. A small quantity of blood has been lost from the nose since yesterday; patient appears worse, and lies in a state of somnolency on his right side; his breathing is difficult, and rather laborious.

12th. Died this morning about six o'clock.

This was one of those cases which Dr Parry would probably have treated by general bleeding, which the state of the circulation, and especially the strong pulsation of the heart, might have justified; and I am in doubt whether I did right in abstaining from it; but I was prevented from using this remedy by the lad's leucophlegmatic appearance, by his having already lost a good deal of blood by epistaxis before he came under our care, and by the conviction, that the diseased condition of the heart was beyond the reach of our art.

I am not sufficiently confident in my own powers of diagnosis by the stethoscope, to give a decided opinion on the nature of the affection of the heart in this case; but in as far as I was able to decide, it corresponded with Laennec's description of hypertrophy of the left ventricle.

Speculation on the causes and nature of *purpura*, I also feel, in myself at least, to be premature. I may be permitted, however, here to observe, that it is pretty evident, on a comparison of what has hitherto come within my reach, that the cutaneous affection from which it takes its name, appears as a symptom under very different circumstances, and, therefore, that it is probable that the pathology of this disease, and consequently its treatment, are not always to be considered as the same.

The above case had not the slightest appearance of connection with scurvy, a complaint (land scurvy) certainly rarely seen in this city, of which, however, I have now and then met with a severe and well-marked case, and of which (sea scurvy) I remember to have seen a good number of cases in its very worst form, in some sailors of the Russian fleet, in the Royal Infirmary of Edinburgh, about 1799 or 1800.

Notwithstanding the distinct manner in which the patient described his disease as originating in the chest, it may be doubted whether the affection of the heart or of the abdominal organs was the first link in the chain of organic alterations. Such a degree of preternatural hardness as could be felt in this patient to exist in the spleen, does not take place in general in the space of time during which he represented himself to have been ill; and, indeed, he seemed to be unaware of there being any thing unnatural in that part of his body. The kind of life which artisans live every where, and particularly in this city, where many are often crowded together, breathe a vitiated atmosphere, and are exposed to many circumstances inimical to health, may predispose and be exciting causes of organic disease, and perhaps of *purpura hæmorrhagica.*

In a former account of a case of *purpura hæmorrhagica*, transmitted for publication in the Edinburgh Medical and Surgical Journal, I expressed the opinion, that, from what had at that time come within my reach, it was pretty evident that this disease was not always to be considered as the same, or, at least, that it occurred under very different circumstances. The following case, which has since come under my care, is strongly in confirmation of the above opinion; and being interesting in itself, and in some measure throwing light on the nature of this disease still obscure, I have not hesitated to send it for publication in the Edinburgh Medical and Surgical Journal, hoping, that, if it suits your convenience, you will give it a place.

Aksinia Traphimoona, a soldier's wife, aged 35, apparently of good constitution, and sanguine temperament, acting as cook to the steward of Astankina,—a country seat of Count Sheremetieff's near Moscow,—was admitted a patient into Sheremetieff's Hospital on Saturday, 30-12th of June 1834. According to her account, she was in perfect health on the previous Sunday; on Monday and Tuesday was affected with *tinnitus capitis*, attended with feverish symptoms, such as, sense of coldness, and then pretty strong heat, which continued even after the loss of blood by the nose and vagina, to the extent, as she says, of several pounds, which began, *per vaginam*, on Monday morning at the menstrual period, and continued till she came to the hospital. The epistaxis began on Wednesday, early in the morning, and continued till 8 o'clock A. M. when it stopped, and has not since returned.

On reception into the hospital, she was observed to be affected with purple petechiæ in different parts of the body, particularly about the back part of her neck and shoulders, and to have a pretty strongly-marked ecchymosis under the right eye, the conjunctiva of which, as well as of the left, was seen to be the seat of *chemosis.* The petechiæ were pretty large,—some of them nearly the size of the flat surface of a small split-pea; besides which, slight ecchymosis was remarked under the skin of the lower extremities. There was no appearance of obstruction or other organic disease observed anywhere, nor of scurvy in the gums or elsewhere. Her tongue was pretty clean.

℞ *Calomel* gr. iv. *Pulv. radicis Rhei* ʒss. *cum Mucil. G. Arab. fiant Pilulæ* viii. *duabus vicibus sumendæ.*
Acidi Sulphurici Aromat. gtt. xx. *ter quaterve de die sumat ex Aqua.*

July 2d. Has had one stool after the pills, which has not been kept; urine rather scanty; what has been passed during the first twenty-four hours after admission is thick, loaded, and depositing a mucous sediment; what has been passed these last twenty-four hours contains still more of the same deposit, and appears red, as if coloured by the admixture of a small quantity of blood; neither coagulated at the boiling heat; no pain about the kidneys. Slight acceleration of the pulse is observed; tongue quite clean; she is affected with slight cough, and, besides general pain of the body, with which she was affected at the beginning of her complaint, and which still, though diminished, continues, she mentions, particularly, pain about the right shoulder, and right side of the chest, and about the shoulder-blade, which she thinks proceed from the cough; has not been subject to costiveness, and has menstruated regularly. The colour of the purple spots is fading, and they seem to diminish in number. *Repet. pilulæ e Calomelane cum Rheo.*

3d. Has passed a good night; two stools of a bilious appearance, and rather dark-yellow colour after taking the pills; urine still scanty, and, as yesterday, appears coloured with blood, depositing a dark-coloured mucous sediment; makes no complaint; spots continue to decline; pulse 96, and soft.

> ℞ *Pulv. Doveri* gr. v. *Calomel.* gr. i. *M. Sumat pro dosi ter per nycthemeron ex Theriaca. Contin. acidum sulphuricum.*

4th. Urine to-day not coloured with blood; of a bilious appearance, and transparent, though pretty deep-coloured, otherwise, state of the patient as yesterday; spots still more faint in colour, and diminished in number.—*Pergat.*

5th. Has been sick yesterday, and vomited once, probably from the powders; has had one rather loose, bilious, and somewhat deep-coloured stool; urine passed in smaller quantity, bilious-looking and turbid; pulse smaller, and of less force. The spots have nearly disappeared.—*Pulverem in usu bis in die tantum sumat.*

6th. Turbid urine, in small quantity, continues; three stools in small quantity, composed of dark-coloured, yellow, and somewhat black-looking bile.—*Pergat.* A more substantial diet in small quantity allowed.

7th. Pulse is become quicker and fuller, 104 in the minute; one small, bilious, soft stool, of a dark-yellow colour; urine still scanty, bilious, and turbid; heat of the skin increased; tongue covered with a white crust; a feverish state is evidently present; cough continues but is slight; and much less than before.—*Pergat.*

9th. Febrile symptoms continue; pulse is frequent, though soft; skin rather warm; tongue is not dry, but slightly crusted; urine still turbid and bilious; bilious, rather dark-coloured yellow evacuations from the bowels the day before yesterday;

since then no stool; complained of pain of mouth yesterday, on which account the powders were not given; cough slight.—*Contin. pulveres c. Calomelane cum Pulv. Doveri.*

R *Tartratis Antimonii et Potassæ* gr. i. *Solve in Aquæ distillatæ* ℥ v.; *adde Aq. Men. Piper.* ℥ ss. *Misturæ salinæ* ℥ ij. *Sacchari albi. Sp. Æther. Nitrosi aa* ʒ i. *M. Omni bihorio cochlearia magna duo pro dosi sumat medicamente.*

10th. Soon after yesterday's visit became sick, and vomited a good deal of green dark-coloured bile; urine very turbid and thick; febrile symptoms diminished; no stool.—*Ad noctem pilulas Rhei compositas tres sumat.*

11th. Fever somewhat increased, continued during the whole day, having had no stool, and complaining of oppression at the epigastrium. A purgative clyster was administered, which was followed by two stools in moderate quantity, consisting partly of a jelly-like matter, but chiefly of dark-coloured yellow bile, almost black, having taken the pills prescribed. This morning she is better, having passed a good night; the skin is moist; the tongue slightly crusted with a yellowish crust; the eye more expressive; she complains of an uneasy sensation at the pit of the stomach; urine of a pretty deep-yellow colour; less turbid than yesterday; pulse still frequent, but less febrile excitement. —*Contin. remedia in usu. Repet. Pilulæ Rhei comp.*

13th. Alvine evacuations and urine still bilious, the former of a more natural colour than last reported; complains of oppression about the epigastrium and right hypochondrium, the former increased to pain by pressure; febrile symptoms diminished; pulse less frequent, and otherwise nearly natural; some nausea this morning, probably from the medicines in use; skin perspiring.—*Misturæ in usu cochlear magnum sumat pro dosi tantum, si urgeret nausea.* Thin diet with beef-tea or bouillon.

14th. Two rather loose, bilious, stools, of a brighter yellow than any hitherto passed; urine still scanty; about lb. iss. in twenty-four hours; still bilious and muddy; pulse quiet, though somewhat more frequent than natural; tongue quite clean; complains of nausea; less appearance of general languor and depression of spirits than formerly.—*Omit. Pulv. Doveri cum Calomelane. Pilul. Hydr. Edin. mane et sero quotidie sumat, alia contin.*

17th. Continues to recover; stools and urine still bilious; the latter, on standing some time, less turbid than formerly. This day's urine is nearly transparent; mouth uneasy, but no appearance of any great irritation there.—*Pilulam Hydr. ad noctem tantum sumat.*

18th. Two sufficiently bilious, natural enough coloured, stools;

urine rather increased in quantity, and turbid; complains of her mouth.—*Utatur gargarismate emolliente.*

19th. Urine increased to about lb. iv. and of a much more natural appearance; bowels easy; discharge now nearly natural in appearance.—*Pergat.* A less spare diet allowed.

21st. Says that she has not slept for three nights; stools less natural than last described; urine continues increased in quantity, but is turbid and crude; tongue more crusted than it has been; appearance of the countenance good.—*Contin. remedia.*

24th. Continues to improve, though stools are still bilious, and of unnatural appearance; now sufficiently copious secretion of urine, which, however, is still crude and watery.—*Pergat.*

31st. Continues well, but alvine evacuations still bilious and dark-coloured, in sufficient quantity.—*Pergat.*

August 2d. Catamenia have not appeared since admission; she wishes to return home. Dismissed cured.

Reflections on the case of Aksinia Traphimoona.—In reflecting on the above case, and comparing it with the former, it naturally occurs that there is a considerable difference between them. In the former, structural change to a great degree had already taken place, probably in the heart, and very decidedly in the liver and spleen. In this no structural change could be detected; but functional disorder was evidently present, and its principal seat,—starting point,—or, as the French would call it, *point de départ*, appeared to me to be the liver, in the venous circulation of which organ it is probable such congestion, or, to speak more plainly, such unnatural accumulation, of blood had existed as to excite a *nisus hæmorrhagicus* for its relief, of which the purple petechiæ may be considered as the consequence; a symptom of itself of but little importance, but more or less useful, as distinguishing this affection from simple hemorrhage. Before the patient came under my charge, the most urgent symptoms had already subsided under the salutary influence of hemorrhage from the *uterus* and nose, which fortunately had taken place in sufficient quantity to produce relief, without appearing to have induced serious or lasting debility. Had I seen the patient at the beginning of the complaint, it is likely I would have employed general and local bleeding and purging. A congested state of the liver, however, and, connected with it, an unnatural state of the bile appeared still to exist, and, therefore, the principal remaining indication appeared to me to be to endeavour to remove this state, and to equalize the circulation through the whole system, by the use of such remedies as are found to act on the secretory organs, increasing and correcting their secretions, particularly those of the liver, kidneys, bowels, and skin. Under this treatment, all symptoms of disease gradually gave way; and the patient, being desirous of returning home, was dismissed in good health on the 2d of August.

II.—*Two Cases of Rabies, one from the bite of a Cat, the other from that of a Wolf; the latter with the Appearances after Death.*—I do not expect that the following cases will interest you or the readers of the Edinburgh Medical and Surgical Journal as much as they have interested myself, nor, after the number already published, do I think it of much consequence to increase the collection, unless by so doing I could contribute to the practical improvement, or add to the pathology, still so uncertain, as is that of the disease which is the consequence of the bite of a rabid animal: On neither of these points am I satisfied that the following cases can add much, if any thing; nor would I have sent them to you, had not the author of observations on the treatises of Messrs Trolliet and St Martin, in the Edinburgh Medical and Surgical Journal, Vol. xxvi. p. 159, expressed the opinion, "that genuine hydrophobia never follows the bite of any other animal than one of the canine family." The first of the following cases is, in my opinion, an indubitable example of fatal *rabies contagiosa*[*] with *hydrophobia*, from the bite of a cat. Beside the face of the case itself, which I think is sufficient to establish its nature, if attention is given to it from beginning to end, I may remark, that I had never before seen a case of *rabies*; but that the symptoms at the time were so distinctly marked, that I could not, nor did entertain, any doubt about the matter. Unfortunately, the cat was immediately killed after the accident, so that its actual state could not be determined. I believe it, however, to be a very uncommon thing for a cat to attack a child in the way this one did, without provocation, or something unusual in the state of the animal, which in the present case I have no doubt was *rabies*. My opinion on the nature of the case has been confirmed by the general similarity of the two cases, and by the absence of any thing like *tetanus* in either case, of which last disease I have seen a few cases.

The appearances on dissection in the second case may not be altogether uninteresting to some of your readers. If you should deem them worthy of a place in the Edinburgh Journal, they are much at your service. Both the cases were for a short time under my care before death, and occurred in the Clinical Wards of the Imperial Academy of Medicine and Surgery, where they were seen by several of the students and others.

CASE 1.—The history of this case was taken by Mr Gleboff, then one of the most advanced of the students of the Academy, and was written in Latin, as is the usual practice at the Clinical Institution. The reports were made by myself in the presence of the students, of which the following is a pretty literal translation.

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[*] I do not know a more correct name for the disease; for the more simple one of hydrophobia being an accidental symptom of some other morbid conditions, and but a symptom of this, is less satisfactory.

Alexis Synzoff, aged 6 years, rather of a weak than strong constitution, has not from his birth been subject to any disease, except a slight diarrhœa, with which he has been occasionally affected. On the 18-30th July 1829, while walking about in the court-yard of the house where he lived, he was unexpectedly bitten in different places of the left hand by a strange famished-looking cat, which came suddenly out upon him from behind some piled fire-wood. The cat was killed; the bitten parts were immediately washed with a solution of common salt in water, and he lost but little blood from the wounds, which healed easily in the course of about thirteen days, a slight suppuration having taken place, particularly in one of the bites, between two of his fingers. On the eighth or ninth day after the accident, he complained of being disturbed by different strange appearances affecting his sight, such as of horses running on the walls of the room; or the house seemed to him as if it shook, and was about to fall, and others of a similar kind. There were, however, no other serious symptoms. After the wounds were healed, he enjoyed good health to the 8th of the following October, when he complained of slight pain in the belly, and uneasiness of the *præcordia*, with nausea, without, however, any change taking place in his usual appetite for food and drink, which he swallowed easily. On the morning of the 9th, however, it was found to be impossible for him to swallow liquids. In this state he was brought by his relations to the Clinical Institution of the Academy, between 11 and 12 o'clock; soon after which time I examined and prescribed for him. The following observations were noted by Mr Gleboff.

At first sight, the appearance of this boy does not seem to be much affected; his countenance, though not cheerful, is placid; his face is pale, as it commonly is; neither general nor partial debility is observed; the eyes, however, are somewhat watery, and surrounded by a red, or rather livid-coloured ring;* the mouth is not dry; the tongue nearly clean, moist and whitish; thirst rather urgent, but he has been altogether unable to force himself to drink, though he attempted it several times. His appetite for food is diminished; he has had no discharge from his bowels for the last twenty-four hours; his skin is dry, and warmer than natural; the pulse frequent, strong, and somewhat hard; he cannot breathe without difficulty, and when he sits, he feels oppression in the chest, and is hence more disposed to keep the recumbent than sitting posture, for his breathing is easier in the former than in the latter. On pressure being made with the hand on the hypochondria, he complained of some slight degree of pain. About half-past 4 P. M., the heat increased, and was generally diffused over the body, continuing about an hour and a-half; about six in the evening, having had a stool after an injection which had been prescribed, the heat of the body, and pain of the hypochondria, became less in degree, the pulse less frequent, weak and softer, but he continued to prefer the reclining posture. At 8 in the evening, he began to mutter to himself, and seemed to fall asleep; the sleep, however, was disturbed, and he frequently awoke, apparently in a fright; he now complained of a sense of much heat, and would not allow himself to be covered; when the hand, however, was applied to his skin, no preternatural heat could be felt.

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* The internal angle of the eyes appeared more red than usual.—J. K.

The following treatment was prescribed by me when I first saw the patient between 11 and 12 o'clock of this day, 9th October.

℞ *Fol. Sennæ* ʒij. *Semin. Corian. cont.* ʒi. *Affunde Aquæ bullientis* ℥vi. *Stent simul in infuso per horæ quadrantem, dein cola, et adde, Extracti Glycyr.* ℈i. *Sulphatis Magnesiæ* ʒij. *M. Cochlear mensale pro dosi detur omni hora, donec Alvus libere exoneretur.*

℞ *Fol. Sennæ* ʒiij. *affunde. Aquæ bullientis* ℥viii. *Stent simul in infuso per horæ dimidium, dein cola, et adde, Salis Glauberi* ℥ss. *injiciatur pro enemate quamprimum. Applicentur Hirudines quatuor ad Epigastrium. Unguenti Hydrar. cum duplice Hydrar. Edin.* ℥ss. *Camphoræ* ʒss. *cum Olei Camphorati q. s. fiat unguentum, quod divide in partes quatuor; infricetur pars una hujus unguenti in femora et abdomen, post hirudines decisos, et altera, cras mane, pro re nata. Vespere pro re nata repetatur enema purgans.*

10th. He has passed a restless night, and the symptoms are evidently increased; hydrophobia continues in a greater degree than yesterday; he has swallowed nothing but some wheaten bread and sugar, and obstinately refuses all liquids. After the use of the injection prescribed, he had yesterday, and again today, a soft, bilious stool, of a yellow but not very deep colour. He has passed urine in moderate quantity, of a mixed appearance *(confusa)*, depositing a mucous sediment; the leeches and mercurial friction were employed, and the friction repeated this morning; he refused to take the purgative infusion by the mouth.

At this time (about 11 o'clock A. M.) yesterday, when we examined the patient, he was much more quiet than he is now, being more agitated, and showing symptoms of much nervous irritation. He can hardly remain for a minute in one place, but is continually running from his bed to the window, and other parts of the ward, and thence to bed again. He tried in our presence to swallow some bread, and the purgative infusion prescribed yesterday, but could hardly accomplish it. His eyes express fright; the pupils are dilated, but when turned towards the light they contract. Some irritation seems to be present in the right ear, since he is frequently trying to relieve it by rubbing the external passage with linen wet with his spittle. Some considerable irritation seems to exist in the œsophagus, which is accompanied as it were with an attempt to vomit or cough; and when the effort becomes urgent, he gets frightened and cries out. The respiration is irregular; sometimes it appears as if natural enough; then it becomes suddenly accelerated, and is continued as it were with sighs. The pulse is frequent, small, and rather weak; we counted it 112 in the minute. There is but little heat of the skin, and it seems rather disposed to diaphoresis. The tongue is quite clean, but redder than natural; no local irritation is observed in the bitten parts, or in the course of the lymphatics of the arm.

℞ *Calomel.* gr. iv. *Pulv. Moschi Orientalis alcoholisati,* gr. viii. *Pulv. Opii alcoholisati,* gr. iss. *Sulphuris Aurati Antimonii,* gr. ij. *Pulpæ Prunorum,* ℥ss. *tere simul probe, et divide in partes quatuor, quarum capiat unam quarta quaque hora si fieri possit. Utatur loco potus si devorare possit, decocto tenui Sagonis. Contin. frictio mercurialis bis in die. Repet. enema purgans heri praescriptum.*

℞ *Tinct. Thebaicæ,* ʒiss. *Tinct. Saponis. Spiritus Vini Camphorati, aa* ℥ss. *Ætheris Sulphurici,* ʒi. *M. Utatur pro frictione anterioris partis cervicis, epigastrii, et spinæ dorsi pluries in die. Applicentur Hirudines tres ad situm laryngis, et vespere vesicatorium cum Camphora conspersum. Comprobetur affusio aquae frigidæ in corpus nudum pro re nata.*

State of the patient between 7 and 8 o'clock in the evening.

The patient's state has not much changed since the fore part of this day, and certainly there is no change for the better; frequent terror, and the greatest general uneasiness are observed; hydrophobia rather increased, and a morbid sensibility also to the touch of fluids is manifest. He now and then complains of a disagreeable impression from the light of the candle; no strongly-marked convulsion has yet appeared; but we have remarked a tendency to spasm in the sole of the left foot; the boy's movements are sudden and unnatural. He has not swallowed any liquid nor other food, excepting a small quantity of bread; he had swallowed before this evening visit, a third or fourth part only of a dose of the electuary prescribed in the forenoon, and now, in our presence, he has swallowed nearly a whole dose at different trials; the leeches ordered to-day were not applied, nor was the blister, the boy refusing to submit to this being employed; the embrocation was used, a second portion prescribed, and partly used; the cold affusion was twice tried with pretty cold water, and, as it appeared, seemed to be agreeable to the patient; he would not allow, however, of its being used a third time. There is a considerable change in the state of the pulse, which is small, and more variable than we observed it to be about midday. The uneasiness described above has continued during the whole day.

℞ *Moschi Orientalis* gr. vi. *Tinct. Opii, Edin.* gtt. xxx. *Sacchari albi* ʒi. *Mucil. G. Arab.* ℥i. *Tere simul quam probe et adde jusculi bovini* ℥ix. *M. pro tribus enematibus, quorum injiciatur unum omni quarta vel quinta hora. Applicetur Vesicat. hodie præscriptum.*

11th. By M. Gleboff. At eleven at night the first injection was given, after which the patient sweated, and soon vomited, the bowels were not moved by the clyster. About midnight and one o'clock, the uneasiness of the patient had reached its height, froth appeared about the mouth, the convulsive movements in the extremities increased; about two o'clock in the morning he sweated much, when spots of a dark-brown colour *(fusco-brunei coloris)* appeared in the face. The sweat had a very disagreeable odour; about half-past two he died. About half an hour before death he was quiet, and remained so till death. About one o'clock he tried to bite, which disposition, however, continued but a short time, and shortly afterwards he remained quiet.

Medical treatment has hitherto shown so little power over this singular and intractable disease when hydrophobia has already appeared, that it may fairly be doubted whether there is any remedy hitherto known on which much confidence can be placed. In the above case, the remedies prescribed had not a fair chance, since they were not employed by the patient as directed; the progress of the disease also was too rapid to admit of the full effect of medicine. The absence of any visible local irritation in the parts bitten is worthy of remark. The case was too well marked to admit of any doubt of the nature of the disease; its character was partly febrile, but more nervous, which, no doubt, was in part connected with the tender age and constitution of the subject, but certainly not less with the nature of the disease itself. I regret much not being permitted to examine the dead body.

Case 2.—Cornelius Agapoff, a cow-herd, aged 20, was admitted into St Catherine's Hospital on the 25–6th October * 1833, when the following circumstances were noted by Mr Rinsky, one of the medical men attached to that institution, who had the charge of the patient till the 22d November, when he was transferred to one of the Clinical Wards under my care.

October 25th. The patient is of a robust habit. About two weeks ago he was bitten by a rabid wolf in the nose, the upper lip, and left ear. The wounds are covered with scabs (*escharae*); in other respects he is in good health.

℞ *Extr. Belladonnae*, gr. ¼. *Sacchari albi, gr.* x. *M. Capiat pro dosi quater in dies. Separatis escharis* (*crustis*) *impositum est sequens unguentum.*

℞ *Unguenti digestivi* ℥i. *Pulv. Cantharid.* ʒi. *M.*

27th. The wounds are suppurating. The same treatment continued.

November 9th. This morning he was affected with tremor of his limbs, which soon ceased. Same treatment.

13th. Wounds are suppurating well; all the functions are going on well. Continue.

22d. I was told by Dr Pohl, physician to the hospital, that *hydrophobia* had come on, and as the case now became more interesting, he proposed that I should take charge for the advantage of the students. I accordingly soon thereafter, about 11 o'clock A. M., visited the patient, and found him alone, and occupied in moistening some bread with milk, which he endeavoured, and succeeded, in swallowing in small quantities at a time. Wishing to see if he could swallow water, I desired an attendant to bring some, but in doing so he expressed much uneasiness, and refused to take it; nor could we persuade him to drink milk, or take it otherwise than I have mentioned above. He was affected even at that time with slight convulsive sighing, or catching of the respiration. I cannot better characterize the state of the respiration than by using the words of a case by M. P. C. Gorey, physician to the hospital at Metz, (Ed. Med. and Surg. Journal, Vol. iii. p. 416.) "I observed him attentively while he spoke, and I perceived, that every time he mentioned drink he made a convulsive inspiration, like that which we experience on going into cold water; the only difference was in its force and repetition. It was easily seen how painful this spasm was to the organs of respiration." The very minute blood-vessels of the eyes were injected with blood, which might, perhaps, in some degree be independent of the disease, and be the consequence of his having passed the two previous nights with but little sleep. I made him turn up his tongue with a view of examining if there was any appearance of the swelling (and worm) mentioned by Marochetti and others, but could see no appearance of anything of the kind,—there being neither swelling nor inflammation present. He seemed to be incommoded by a frequent desire to hawk and spit, but made no particular complaint. The following report was made at his bed side.

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* I saw this patient on the 25th Sept. 6th Oct. in the receiving-room of the hospital, when he and another man accompanying him gave me the following account of the accident. While herding some cattle in a wood about sixty versts from Moscow, on the road to Mojaisk, about three weeks before, a wolf broke in on the herd. He stated that he had endeavoured to beat off the animal with a pole, the end of which the wolf seized with his teeth, but soon quitted his hold to attack himself, when he was thrown down, and bitten in the face in three places,—one near the root of the nose on the left side, another above the upper lip, and the third behind the left ear. When I examined these parts I found them all covered with superficial scabs; the bites had not penetrated to any depth, nor did the largest scab extend to more than three-fourths of an inch in length, and about a quarter of an inch in breadth; there was no swelling nor inflammation, nor other appearance of irritation about the scabs or adjoining parts; in other respects he appeared well and rational. The wolf had bitten several other persons, of whom, however, I have had hitherto no account.

Although the patient is now sitting quietly enough on his bed, *hydrophobia*, however, exists, so that we have not been able to persuade him to try to swallow liquids. He has, however, swallowed some bread moistened with milk without much difficulty. It appears from the patient's account, that the difficulty of swallowing has already existed more or less for two days. The pulse at the wrist is 104 in the minute; he has slept ill these two last nights; he suffers from thirst, and seems to feel some uneasiness about the heart; the secretion of saliva seems to be increased; but the breathing not to be otherwise affected than is mentioned above. This morning he felt uneasiness at the top of the pharynx, which still continues; the bowels are said to be easy; some purple spots resembling petechiæ appear on the inside of the under lip under the cuticle; nothing particular appears in the expression of his eyes, and he can look at the light without uneasiness.—*Omittantur pulveres e Belladonnae. Emittr. Sanguinis e brachio ad* lb. i. *postea admoveantur hirudines octo ad anteriorem superiorem partem colli. Infricetur femora Unguenti Hydrar. cum duplice Hydrar.* ℥ss. *et repetatur frictio cras mane. Vespere post usum hirudinum. Admoveatur vesicatorium ad anteriorem superiorem partem colli. Si symptomata nervosa adaugeri videantur, posteriori parte dici utatur affusione frigida, et repetatur omni tertia vel quarta hora. Si opus fuerit, versus horam septimam vespertinam injiciatur enema purgans.*

℞ *Calomel.* gr. v. *Pulv. Jalap. Comp.* ʒss. *Electuarii lenitivi* ℥ss. *Opii.* gr. i. *M. Sumat pro dosi.*

About seven he became very uneasy; he is now delirious, and is continually spitting; the pulse is much more frequent than it was in the forenoon; he swallowed the electuary, and has had one small consistent stool. From twelve to fourteen ounces of blood were taken from the arm, which has a natural appearance; the mercurial friction has not yet been employed; the cold affusion was not used, and as there is now sensible perspiration on the skin, is not insisted on; the leeches and blister were employed.—*Utatur Unguento Hydrar. mane praescripto quam primum.*

> ℞ *Tinct. Theb.* ʒij. *Camphorae* ℈i. *Axung. Porci* ℥iss. *M. utatur pro frictione corporis in genere quantitate cochlearis thearii omni quadrihorio. Repetr. enema purgans.*
>
> ℞ *Extr. Opii.* gr. x. *Mellis communis* ℥ss. *M. et divide in partes octo, omni hora detur pars.*

Nine o'clock in the evening. He is standing at the foot of the bed with his body bent forward, lamenting most bitterly in a loud voice, very unruly, talking nonsense, complaining of his having been bled unnecessarily. He was now so much beside himself that I thought it necessary to confine him to his bed by the long-sleeved shirt. The delirium was in kind rather maniacal than febrile, and as long as I remained with him, consisted of loud bewailing and complaint, apparently more connected with feelings of general and partial uneasiness and misery, than proceeding from acute pain. The long sleeved-shirt was put on him in my presence without much difficulty; and although at first he struggled a good deal, he soon became more manageable under its use.

23d. Five doses of the opiate electuary were given, and are said to have been swallowed; the mercurial friction was employed for about a quarter of an hour; convulsions of the extremities began about midnight, and increased till one o'clock in the morning; about two he expired.

I saw the dead body about 3 P. M. of the 23d, when the countenance had much the appearance which those who have been hanged are said to have; it was much puffed up, and as it were swelled and livid, with frothy saliva about the mouth. The appearance of the upper part of the body looked very like that of one dead of sanguineous apoplexy. The following evening at 6 o'clock, when the dissection took place, these appearances had much subsided. Unfortunately we were obliged to examine the body under the disadvantage of candle light.

Dissection.—The external appearance resembled that of those who die of sanguineous apoplexy or from hanging,—that is, the countenance was swelled and livid, and froth was observed about the mouth twelve hours after death. Now, forty hours after death, these appearances are less remarkable, the superior extremities are relaxed, but the inferior rigid. The muscles in general had a florid red appearance, as is the case with those who in health are killed by accident; although no inflammation was observed in the spinal chord, its blood-vessels in general, however, were filled with blood, and all the neighbouring parts were of a florid red colour. On opening the cranium, the vessels of the *dura mater* seemed to be filled with a large proportion of blood, and about the quantity of two table-spoonsful of dark-coloured blood was found to be contained in a sac near the surface of the back-part of the right hemisphere of the brain; the sac was sunk into the substance of the brain, and appeared to be formed by the arachnoid and *pia mater* in an opaque condensed state; the contained blood was partly fluid, but thickened, and without particular odour, partly separated from its fibrine; a thin stratum of venous blood seemed to be effused between the arachnoid and *pia mater* of the right hemisphere, in that part where the hemispheres come in contact, and extended as far as their union. The blood-vessels of the brain in general seemed to be much more filled with blood than they usually are in subjects where no unusual determination of blood to that organ appears to have existed during life.

The upper part of the *pharynx*, the root of the tongue, the internal surface of the *larynx* and *epiglottis*, were much inflamed, and the inflammation extended to the *bronchia;* and although the lungs crepitated, and no true hepatization was observed, their natural colour, however, was much changed, and considerable congestion was evidently present, since their whole substance was of a dark-red brownish colour,—a good deal like the colour of extract of catechu, or the deposit from old tawny port-wine,—and they were considerably distended.

The villous coat of the stomach also was partially, though not extensively, inflamed, particularly the rugæ, which were strongly prominent in this subject; the inflammation was of a much deeper tint than that of the *pharynx;* the *œsophagus* was natural, and that part of it which lies immediately behind the *larynx* was remarkably contrasted in colour with this latter, which was of a bright diluted vermilion, whereas the former was of a pale white or ash colour.

About an ounce of *serum* was found in the *pericardium.* No particular appearance was recognized in the heart or its cavities. The diaphragm and all the abdominal *viscera* were natural.

It was very evident in this subject, in as far as can fairly be inferred from the *post mortem* examination, that the brain and organs of respiration had been the principal seats of irritation;

but what is singular, there was no cough, though much hawking and spitting.

The patient's pulse at my forenoon visit on the 22d was frequent, as mentioned in the report, but it was neither hard nor remarkably full; the skin, if not dry, was not moist; but in the evening there was a moisture on the skin, which made me doubt at that time the propriety of using the cold affusion, which, therefore, was not tried. Perhaps we might have tried the vapour-bath with some probability of utility. I regret the trial was not made. Were I again to treat a case of this disease, I would insist, and be more active in the antiphlogistic treatment than I was, and particularly would recommend the use of a greater number of leeches about the fore-part of the throat, free bleeding at the jugular vein, and the inhalation of the steams of a decoction of chamomile in milk or other emollients, with, perhaps, the vapour-bath.

At the time of my first visit to this patient, he seemed to be labouring with suppressed fear; asked what kind of treatment we meant to pursue with him, and spoke as if afraid of some surgical operation, of which it is probable he had got some notions during his stay in the hospital. About five o'clock in the evening of the day he came under my charge, he managed to swallow four table-spoonsful of water, by a table-spoonful at a time, turning his head to one side.

It appeared from the account of Mr Rinsky, as well as from some patients in the ward where the patient had been on his first entering the hospital, that he had been subject to epilepsy. The following circumstances were detailed to me at a future period by the nurse and patients.

At first when he was with them he made no particular complaint, ate his food and drink without difficulty; twice, however, during his stay with them, he had nearly fainted, once during the night, and the second time in the day, and was observed to be also affected with general trembling. The two last days he remained with them, he complained of a sensation in his throat, as if a piece of meat were sticking in it, lost his sleep, and was observed to spit frequently. Being asked by the nurse why he did not sleep, he replied that he could not, because he would then be choked by the spittle in his throat. The other patients now remarked the difficulty with which he swallowed, particularly fluids, and the disagreeable sensations he seemed to experience when water was given him to wash with.

Remarks.—It may be questioned in this case whether or not the bleeding was carried far enough. According to those who trust in this remedy, it should be carried very far, *ad animi deliquium* from the quantity drawn.—(Vide Ed. Med. and

Surg. Journal, Vol. ix. p. 22, Schoolbred and others.) On consulting Van Swieten's Commentaries, I find the same practice recommended by Boerhaave:—"Statim post prima signa invadentis mali (Rabies) morbus tractandus ut summus inflammatorius mittendo sanguinem ex lato vulnere magni vasis ad animi deliquium usque." In the same section, § 1144, a case is quoted of recovery by such treatment. Acad. des Sciences l'an 1699, Hist. p. 58, and one from Medical Essays, Tome v. part 2d, § 51, p. 592, of marked relief from this remedy. No remedy used seemed to have any good effect, but certainly the mercurial friction was not used as prescribed, owing to some misunderstanding among those about the patient. The complication of epilepsy was not known to me till after death, and might have some connection with the blood found in the brain. If ever I happen to have an opportunity of treating this disease again, I certainly will follow Dr Schoolbred and Mr Timons' practice, of very copious blood-letting, the probability of utility being confirmed by what I observed on dissection. Their practice was not known to me, or remembered at the time the case occurred, and I had to prescribe on the spur of the moment. It is extremely difficult to reason on the pathology of this disease; nor can I say that from the above case (the second that I have met with) have my ideas or knowledge of the complaint been much improved, from careful comparison of the whole subject matter with the appearances on dissection. I was inclined to think (before reading the account of Messrs Trolliet and St Martin's observations in the Edin. Med. and Surg. Journal for 1826, Vol. xxvi. p. 139,) that the windpipe, and particularly the *glottis* and *epiglottis*, were the parts principally affected in this case, and from a comparison of both cases, that the symptom of *hydrophobia* arose from the extreme nervous irritation, or, if I may so express myself, concentrated sensibility, in parts naturally so peculiarly endowed with this principle, now wonderfully increased by inflammation. Those who have witnessed croup and *laryngitis*, or have observed the effects of any foreign matter received into the windpipe, will best conceive my ideas on the above.

I much doubt if spasm of the *œsophagus* or muscles of deglutition has nearly so much to do with *hydrophobia* as is commonly thought, and believe that if either solids or fluids could be thrown over the top of the windpipe and pass the *pharynx*, the patient would have but little further difficulty in swallowing. It seems to be the impression made on the mind by the experienced painful sensation on any fluid matter, particularly touching the irritable and irritated top of the windpipe, and perhaps the pharynx, which produces the horror we call hydrophobia in the system, whose sensorium and nerves are painfully excited by the action of the poison.

I feel that the limited experience I have had of this disease does not entitle me to draw the above as a general conclusion; I therefore only wish it to be considered as the impression made on my mind by the above cases at the time they occurred.

That considerable congestion had taken place in the lungs, and that the vessels of the brain were generally much distended with blood, cannot be doubted from what is stated above; and it may be a question at what period the effused blood found ensacked between the arachnoid and *pia mater* had been deposited. The determination of this question is rendered still more difficult by our having been informed after the dissection, that the patient had been subject to epilepsy. Were I to judge from the appearance and odour from the blood effused, I should conclude that the effusion had not long taken place before death. There was no appearance of inflammation, properly so called, suppuration, or gangrene about the sac; nor did any part of the body exhibit the slightest marks of putrefaction. I have not yet been able to learn farther particulars as to the duration, &c. of the epilepsy. The wounds of the face were in full suppuration on the morning of the 23d, and when the dressings were removed I did not notice any thing else in their appearance worthy of being noted.

It is not unworthy of remark, that the appearances of inflammation observed in this case in the windpipe and stomach correspond pretty accurately with the appearances observed in these parts on dissection in the dog and pig.—Vide Ed. Med. and Surg. Journal, Vol. viii. 1812, p. 492, paper by Mr Gillman.

III.—*Case of Chorea, terminating fatally, with the account of the appearances on dissection.*—Mark Vassilieff, aged 13, affected with symptoms of *Chorea St Viti*, was admitted a patient into Sheremetieff's Hospital on the 23d December 1833.

The disease exists in a great degree. His body is small, and puny-looking, much emaciated, and he has a fatuous appearance; the whole countenance appears as if swollen, and it is red, the upper lip swelled, the nostrils flattened, and his features distorted, which, with the irregular motions to be immediately described, and his impotency, communicates, at first sight, an impression of disgust to the spectator, at the same time that it excites compassion for his unfortunate and helpless condition. The whole body is affected with the peculiar motions which characterize this complaint; his head is bent downwards, so as sometimes nearly to touch his feet.

In order to prevent his falling from his bed, he has been placed on a mattress on the floor, where he is now rolling himself about in all directions. When spoken to, he understands what is said, but does not speak. The skin is dry, and covered with a dry itch-looking eruption; the skin of the larger joints is thickened and hard, and the abdomen feels hard and tense, from the contraction of the muscles; its volume is moderate; he admits of no covering on his body excepting his shirt, though the temperature of the surface is low, particularly in the extremities, which not rarely appear almost livid. The tongue is moist; his appetite voracious; the pulse at the wrist weak, hardly to be felt; nothing very particular remarked in his breathing.

He is not in a state to communicate any information on the origin of his complaint, but the following has been collected from those with whom he lived.

The boy is an orphan, and has every appearance of having been little attended to. He does not appear to have formerly suffered from any other disease, or to have been exposed to any particular cause to which his present ailment might with probability be referred. About the beginning of his tenth year, his voice became hoarse, and, from time to time, various nervous symptoms, but particularly irregular movements of the muscles, began to be observed. Two years ago these symptoms increased, and gradually became worse, till about the month of October 1833; since then they have continued nearly in their present state. There is no external mark of disease about the spine, and his bowels are said to be regular. During sleep, the irregular movements nearly cease. On the evening of his admission, the following was prescribed by Mr Ramich, one of the surgeons of the hospital.

> ℞. *Tinct. Opii*, gtt. viii. Ph. Edin. *Castorei*, gtt. xii. *Aquæ Lauro-cerasi*, gtt. xiv. *Liq. Cornu Cervi Succinati*, gtt. vi. *Aq. Puræ*, ℥i. *M. Pro haustu ad noctem.*

24th. I prescribed, *Calomel*, gr. i. *Ext. Hyos.* gr. ¼. *Amyli*, gr. vi. *M. Pro dosi ex Melasse mane et ad noctem quotidie. Balneum tepidum cum furfure omni biduo. Contin. Haustus.* Plain nourishing diet.

26th. *Frictio Spinæ dorsi cum Balsamo anodyno mane et vespere.*

31st. No change for the better, excepting that he sleeps better, and more than formerly; no appearance of feculent accumulation in the intestines, or other morbid state of the digestive organs, excepting the unnatural appetite for food; bowels easy. *Omit. Pulvis e Calomelane.*

℞. *Carbonatis Ferri* ʒi. *Pulv. Rhei,* gr. vi. *Mellis,* ℥i.
M. tribus dosibus quotidie consumat.

January 7, 1834. State of the patient improved; unnatural movements less remarkable; he can now stand without help on his feet, supporting himself on the side of his bed; bowels appear to be sufficiently open; feces are more or less coloured by the medicine in use; affection of the skin much as before.—*Pergat.*

10th. He was removed, for the advantage of the students, to the Clinical Institution of the Academy of Medicine and Surgery.

13th. The patient continues better; the irregular movements are less remarkable; he frequently walks about in the ward; sleeps well during night; bowels regular; unnatural appetite, however, continues; his skin is softer; the bath seems to be useful to the patient, and he himself desires it.

17th. State of the patient nearly the same.—Continue.

23d. The state of the patient continues improved; he can now pronounce a few words.—*Adaugeatur quantitas Carbonatis Ferri ad* ʒiss. *quotidie.*

26th. The state of the patient has undergone a change for the worse; he has passed a restless night, and has been almost constantly crying out; the unnatural movements are increased; the skin is harder than formerly, particularly in the extremities, about the joints; bowels are moved twice in twenty-four hours; voracious appetite continues.—*Omit. Carbonas Ferri. Alia contin.*

28th. Increase of symptoms continues; unnatural movements seem to have increased; he passes restless nights. The skin of the right wrist and about the buttocks is incrusted, and affected with fissures. In the lower part of the spine, about the lower dorsal vertebræ, a swelling has appeared, which is rather soft and diffused, about four inches long, and two broad; it does not fluctuate perceptibly, nor does pressure on it appear to excite pain, the skin which covers it is not inflamed. The other symptoms continue.—*Omit. frictio cum Balsamo Anodyno; Fricetur pars superior Spinæ dorsi Ungt. e Tartaro emetico. Balneum in usu contin.*

29th. He has had no stool for twenty-four hours.—*Infusi laxativi Viennensis,* ℥ij. *Sumat pro dosi. Alia contin.*

30th. After the use of the laxative infusion, he had two stools, the last of which only has been kept; the excrement is slimy, but otherwise little changed from the natural appearance. The cutaneous affection seems rather to increase than diminish. The increase which had taken place these last days in the spasmodic symptoms has again subsided, and he is now nearly in the same state in which he was when he was brought to the clinical ward. He is said to be considerably incommoded by the itching of the cutaneous affection; his tongue is quite clean.

℞. *Florum Sulphuris*, ℥ss. *Mellis despumati*, *q. s. ut fiat electuarium, cujus detur moles cochlearis thearii, pro dosi bis in die. Omit. medicamentum cum Tinct. Thebaica et Aqua Lauro-cerasi, vice cujus pulverem sequentem sumat ad noctem. Ext. Opii aquosi*, gr. ij. *Aleo-sacchari Menthæ*, gr. xvi. *Intime misceantur et dividantur in partes* viii. *quarum unam capiat pro dosi ut supra praescriptum.*

31st. For some nights the patient is said to have slept ill; for these two last, however, he has enjoyed good sleep; he seems now disposed to sleep; he supports himself by his feet and seat, with his knees bent, and his head inclining forwards, nearly to the floor; the convulsive movements in this position and state nearly cease; he has had one stool, nearly of the same appearance as yesterday, but of a strong odour; his urine is rather watery, and little coloured.

February 1st. He has had one sufficiently copious, soft, and rather slimy stool, of less natural appearance than any we have yet seen, and of an offensive odour.

2d. He has had two soft slimy stools; colour of excrement still more unnatural than that of yesterday, having something the appearance of earth. Pimples have appeared on the back from the use of the tartar emetic ointment; its use, therefore, has been laid aside for the last two days.—*Ad Elect. sulphuratum adde massae Pilul. Rhei Comp. in pulverem redactae*, ʒi. *Alia continuentur, omisso Unguento e Tartaro Stibiato.*

5th. Has had three soft stools, coloured with recent bile; now, for the first time, the patient is found in the decumbent posture.—*Pergat.*

7th. The cutaneous affection seems rather to diminish than increase; there is but little change in the state of the unnatural movements; sometimes, however, he is able to walk a little; he passes the night pretty well; unnatural appetite for food continues; the stools passed yesterday are strong smelling, have a less natural appearance than the last described, and contain an *Ascaris lumbricoides.*—*Repetat. frictio cum Ungt. e Tartaro stibiato, et quaque vice utatur*, ʒi. *pro frictione ad totum tractum Spinæ dorsi, mane et vespere. Contin balneum.*

9th. He has had three pretty copious, soft, and fetid stools, partly of a more unnatural appearance than any we have yet seen,—what has been last discharged has an earthy appearance. —*Ad Elect. cum Sulphure in usu adde, Massae Pilul. suboxydi Hyd. nigri. Ph. Ruth. Castrensis*, ʒss. *prius in pulverem redactae; alia contin.*

12th. From continued friction of the chin on the breast, the skin under the first is excoriated; he is said daily in the morning to walk about for some time without assistance, but not during any other part of the day; the cutaneous affection seems gradually to give way; he passes the night quietly. To-day he has had one, and yesterday three sufficiently copious, soft, but not liquid stools, of a more unnatural appearance than any yet discharged.

℞. *Sulphatis Kininae,* gr. i. *Amyli,* gr. i. *M. bis in die sumat ex melasse. Alia contin.*

14th. The bowels continue to discharge the same unnatural feces which we have already described.

16th. The emaciation of the body and general debility are increased; the bowels have freely discharged six or eight times during the last twenty-four hours, soft, but not liquid excrement, of a very vitiated nature, of a deep greenish-yellow colour; to-day he has had one small stool, which partly consists of the above, and partly of bloody mucus; from the irritation of the tartar-emetic ointment, a copious eruption of pustules (which, however, in a great measure are now dried up,) has been produced; he has kept the decumbent posture more than usual, and seems uneasy; the itchy eruption has in a great measure disappeared.—*Elect. in usu semel in die tantum sumat; alia contin. Omit. pro tempore frictio cum Ungt. e Tartaro stibiato.*

18th. The patient is now lying on his back; the convulsive movements have ceased; his eyes are half shut; his breathing slow; no pulse to be felt at the wrist.—*Omit. medicamenta in usu.*

℞. *Vini albi Hispan.* ℥iij. *detur cochleatim cum aqua tepida ex tempore ad tempus.*

19th. Died about four o'clock this morning.

Dissection.—The examination of the body took place thirty-six hours after death.

Hardly any remains of the cutaneous eruption described in the history and progress of the case are to be seen in the dead body, unless it be in the hands, where some rhagades are still visible. The body in general is very much emaciated; the upper part of the abdomen collapsed, and its skin livid, the under part in some degree swelled. The swelling is soft, but not tense.

The pericranium was unusually pale, and hardly a blood-vessel is perceived. The thorax was rather more than usually prominent. The substance of the brain was in general perhaps somewhat softer than common, but no other morbid appearances observed in this organ. The muscles of the back were of a moderately red colour, and no remains of the swelling mentioned in the report of 28th January appear.

On opening the vertebral canal, there was observed on the external surface of the coverings of the spinal chord, through their whole course, an unusual redness, which seemed to arise partly from congestion of venous blood in the vessels of the cellular membrane of these parts, and partly from effusion of blood into it, the whole chord appearing as if imbedded in a soft coagulum of blood; in certain parts, the colour of the blood was arterial. The coverings of the chord being laid open, the watery fluid of this part was discharged pretty copiously; the colour of the chord was much less red than the external surface of its membranes, and its substance generally softened into a pulp.

On laying open the abdomen, the swelling of the lower part was seen to have been produced by the distension of the urinary bladder. The convex surface of the liver, particularly the right lobe, adhered to the diaphragm by firm, evidently not recent, adhesion; the smaller intestines were empty nearly through their whole course; the colon contained liquid bilious feces in moderate quantity, of different colours, and of the same nature with what had been discharged during the last days of his life; no organic disease appeared to have existed in the internal surface of the stomach and intestines; the rugæ of the former were very prominent; seven *Ascarides lumbricoides* were found in the cavity of the *intestinum ileum.*

The liver had a deep dull-red colour, but no notable congestion appeared in this organ, its volume small, and its substance not differing much from its common consistence, though the look of the organ was unhealthy. The heart was unusually small for a subject of 13 years, though proportioned to his stature in some degree; its internal structure natural; partial old adhesions of the *pleurae costalis cum pulmonali* existed. The lungs and other organs were nearly natural.

Remarks.—The pathology of this singular disease, notwithstanding the useful practical observations of Dr Hamilton and others, is still obscure, and, of course, its treatment unfixed. Morbid anatomy has hitherto thrown but little light on its nature, since the disease is seldom fatal; and of those who have died, few have been examined. On this account the above case may have some interest; and when compared with what is already known and recorded on this disease, may perhaps enable us to advance a little in our knowledge of its nature and cure.

Those who have hitherto treated of chorea from the time of Sydenham to the present day, seem to have trusted the treatment of this disease either to evacuants or antispasmodics, stimulants, and tonics, and some have combined the use of these remedies, or, having first employed evacuants, concluded the treatment by the exhibition of tonics, of which metallic salts seem to have been chiefly employed. That both these opposite methods of cure have been attended with success, there is no doubt; and this is no singular case in the practice of physic, where the same object is sometimes effected by different means; as in mechanics, the same end is sometimes produced by adding or withdrawing a weight, and increasing or diminishing the power of a spring.

Till the publication of Dr Hamilton's work on Purgative Medicines, we had no rational ideas on the theory of this disease, which, having often succeeded in curing by the use of a course of purgatives, during which an immense quantity of feculent matter in a very unnatural state was discharged, he naturally enough believed this unnatural accumulation to be the cause of the complaint; and the removal of it to constitute the principal part of the cure. Here, however, let me remark, that the alvine evacuations during the cure of chorea are frequently not only unusually large, but, as Dr Hamilton has himself observed in his Appendix, are of a very vitiated nature; and that this is the case not only during the first days of the treatment, but for a long time afterwards. Hence it is probable that the change in the appearance of the evacuations is not the effect of mere remora, but that the secretions of which they are chiefly composed, especially the biliary, come into the intestinal canal in an unnatural state. This naturally leads us to the question, whence these unnatural secretions proceed, which we can only answer by referring them to some diseased condition of the organs by which they are formed; for undoubtedly this change does not entirely depend on chemical agency in the course of the alimentary canal. An unhealthy state of the circulation in the abdominal viscera, and particularly in the liver, will give us a more satisfactory explanation of the cause of the nervous symptoms which characterize this complaint, than the supposition that its exciting cause only consists in an unnatural accumulation of feces in the intestinal canal, which, though frequently, does not always seem to exist, or the theory of Dr Redman Cox, who supposes it to be the effect of hydrocephalus, which dissection showed* not to have existed in the present case.

The present case, as illustrating in some degree, and confirming the above idea, I consider as valuable; for though the aid which we derive from morbid anatomy in regard to this disease is hitherto very scanty, still, in the present case, I think the circumstances related bear me out in the probable opinion, that from neglect, the state of the digestive organs of this poor boy had gone into such a state as totally to undermine his health; that at some undetermined time such congestion had existed in the liver as to have excited inflammation, and consequent adhesion of a part of its convex surface to the diaphragm; that the existence of this congestive state of the abdominal circulation is rendered still more probable not only by the symptoms observed, but also by the blood found effused into the medullary canal, which appeared to have been more immediately the cause of his death, and which may be considered as a link in the chain of cause and effect.

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* Med. and Phys. Journal, 1805, Vol. xiii. p. 401.

What may have been the cause of the softening and pulpy state of the spinal chord, and what its influence on the disease, or whether this morbid change ought to be considered as cause or effect, in the present state of our knowledge, it is difficult, or perhaps impossible confidently and justly to determine. The impression which a careful attention to the history and progress of the case, and examination of the dead body, has made on my mind is, that the long-continued unnatural state of the abdominal circulation had associated with it a similar condition in the circulation of the blood-vessels of the vertebral column and spinal chord, from which both the softening of its substance, and laterally the rupture of one or more blood-vessels on the internal surface of the vertebral canal, or external surface of the medullary membranes had been produced, whence proceeded the coagulum of blood mentioned above.

During the whole time the patient was under my care, I paid particular attention to the appearance of the alvine discharge, and frequently noted its state, as may be seen by the reports. My first idea was to treat the case according to Dr Hamilton's practice, and, before prescribing any purgative medicine, I examined the state of the alvine discharge repeatedly, but neither from this nor from the examination of the abdomen of the patient, could I see reason to believe that any unnatural accumulation of feces had or did exist. For some time, likewise, the appearance of the discharge was so nearly natural, as to make me lay aside the small doses of calomel which I had prescribed, at that time seeing no reason to believe that, in as far as the biliary secretion was concerned, there was any thing unnatural. I, therefore, uncertain of the cause, determined to trust the principal part of the treatment to pretty large doses of carbonate of iron, which about that time I learnt from the Lancette Française of Paris, 6 Fevrier 1833, No. 18, Tome vii., had been frequently used with success by Mr Elliotson in St Thomas's Hospital, London,—at the same time observing his precept to keep the bowels easy under its use. This treatment was continued from the 31st December 1833 to the 23d of January

1834, the patient having improved considerably, when the quantity in use of the carbonate of iron was increased. On the 26th the patient's state changed for the worse, and the propriety of continuing this medicine being doubtful, it was laid aside.

I had hitherto trusted the treatment of the cutaneous affection (which I regarded as a *dyscrasial itch*, if I may be allowed the expression,) to the observance of cleanliness, and the emollient tepid bath; but as the patient seemed to suffer much from the itching, I thought it prudent to endeavour to get gradually rid of this irritation, by adding the internal use of sulphur; after taking a few doses of which, a very marked change (evidently not arising from any chemical action of the sulphur on the feces, took place in the appearance of the alvine discharge; I therefore thought it necessary to keep the bowels still more free than they had been; and on the 9th of February, the discharge still continuing very unnatural under this treatment, added an alterative mercurial to the laxative electuary then in use. It was now evident that the treatment was producing considerable effect on his system; but on the 16th, there was not only any real improvement in the state of the disease, but he was evidently losing ground; the vital energy began to fail, and he sunk on the morning of the 19th with appearance of oppression of the system, but without convulsion or palsy.

It was evident from the appearance of this poor boy, that, from whatever cause there had existed a defect in the natural evolution of the size and power of the body, I do not remember to have ever examined the body of any subject of his age, where the heart appeared so very diminutive, which may have had no small effect in contributing as a predisposing cause to the induction of the disease. Its long continuance, and his weakened frame, made it but too probable that no treatment could have succeeded in effecting a cure; but, had the powers of his system been sufficient to have supported him under the proof, its most rational, and, probably, most successful treatment would, I think, have been found in a moderate combination of the alterative, evacuating, and tonic treatment. How far these ideas and treatment may be applicable to other cases I will not at present pretend to decide; but will only remark, that, though I have not rarely seen the purgative treatment succeed, I have also seen both it and the tonic fail, and therefore think we are more likely, in such circumstances, to succeed, by combining them with the use of alteratives, by which I particularly mean mercurials in small doses, and repeated at short intervals of time, occasionally, perhaps, applying a few leeches round the anus, and to the spine, or region of the liver, and using external stimulants and anodynes, tepid, and sometimes the salted shower-bath, as circumstances, ever-varying, seem to indicate.

I fear I have trespassed too long on your patience and that of the readers of your excellent and useful Journal by these details. The only apology I can offer is the hope of being of some use, which I think he who has treated a case may sometimes effect, by a chastened and faithful detail of what has passed through his mind during its cure, and directed his practice.

Moscow, 9-21*st July* 1834.

ART. IV.—*Cases illustrative of various points in Pathology.* By JOHN SCOTT, M. D., Fellow of the Royal College of Surgeons, Edinburgh.

CASE 1. *Perforation of the Intestine, with external opening.* —May 1834, M. B., 8 years of age, of a fair complexion, had been observed to be unwell for some weeks. She was listless and unwilling to exert herself, with variable appetite, but without any particular complaint. The face was sallow and wasted, with a peculiar withered, contracted and anxious appearance, forming a striking contrast with the rest of the body, which was only slightly emaciated. The abdomen was generally tumefied, without pain on pressure; the tongue loaded; the breath foul; some degree of thirst; the bowels irregular, rather lax than costive; the pulse 106; the skin dry; she had some cough, but no pain in the chest. Small doses of calomel and castor oil were given, and the evacuations were found to be light-coloured and very fœtid. After a few doses of medicine, the tumefaction of the abdomen was somewhat diminished; but in three weeks afterwards it again increased, and the veins running over it became enlarged and distended, and the skin assumed a dark-brown colour, with considerable œdema at the lower part of the abdomen, and great swelling of the labia. The feet and ancles also began to swell, and in a few days obscure fluctuation could be felt in the abdomen.

By the use of diuretics the kidneys were brought to act freely, the œdema of the legs disappeared, and the abdomen diminished in size. On examination it was now found to yield a firm irregular resistance. There was a degree of peculiar hardness on the right side, where she complained of severe pain on pressure. The emaciation of the face and lower extremities was now very great, but the appetite remained good. In August the abdomen was of a somewhat conical form, the umbilicus being the apex, round which there was some degree of inflammation and pointing.

The apex at length gave way and discharged a considerable quantity of fluid feculent matter, of a brown colour and extremely offensive odour. From that period no feces passed *per anum*, and she lived a month, during which they were discharged by the *umbilicus*. After an interval of a few hours, the abdomen was observed to be prominent on the lower part, and on removing the dressings, the feculent matter gushed out in a stream about the thickness of a finger, and continued to flow till the abdomen became flaccid. The feces, after a time, lost the offensive odour, and became of a light yellowish colour. Emaciation was now extreme; the appetite remained exceedingly good, and she continued to take food with much relish. The cough became very troublesome. She died on the 7th of September.

The body was examined two days after death by my friend Dr Sharpey, and the following were the appearances observed. Extreme emaciation had taken place. On opening the abdomen, the viscera were found adhering to each other and to the *parietes* every where, except in the lower part and towards the right side, where a considerable collection of feces was interposed between the anterior wall of the abdomen and the agglutinated viscera. The external opening at the umbilicus observed during life, led into the space occupied by the feces, into which they had escaped by two perforations in the *ileum* near its termination, and one in the colon at the commencement of its arch. The whole of the peritoneum, both where it lined the cavity of the abdomen and where it formed the serous coat of the viscera, was beset with tubercles, a few of which were in a softened and suppurated state. The mucous membrane of the stomach and intestines was generally sound, of a white colour and natural firmness, so much so, that it could be drawn out from its peritoneal covering in large portions. Here and there, however, the tubercles had encroached upon it, giving rise to small elevations, some of which were inflamed and a few ulcerated, and there seemed no doubt that the perforations, which had inflamed and discoloured edges, had been the result of such ulceration. These different conditions of tubercle at different points of simple elevation from subjacent tubercle, of inflammation and of ulceration, seemed to show that the affection of the mucous membrane was secondary, that it was produced by encroachment of tubercles from without, and had passed through the abovementioned conditions in succession, as the stages of its progress, till it ended in perforation. The mesenteric glands were enlarged and tubercular, and many of them were tinged with a blackish colour. The liver adhered to the adjacent parts like the other viscera, but was otherwise sound.

This case presents several points of interest. The little disturbance which the presence of feculent matter in the abdomen appeared to have produced, (for the precise period when it took place was not marked by any aggravation of symptoms,) when compared with the same occurrence in a healthy state, is remarkable. The agony usually produced in such a case is well known. A patient of mine in hospital in Ceylon, after the ordinary symptoms of hepatitis, suddenly complained of intense pain over the abdomen, which continued unabated till death,—an event that took place in eight hours. On dissection, it was found that a small abscess in the concave surface of the liver had burst into the abdomen, no previous adhesion having taken place. The peritoneal surfaces were of a deep red colour, but without effusion of lymph.

In the present case, life seemed to be prolonged rather than shortened by the artificial opening. We had tubercular disease of the mesenteric glands, with a healthy mucous membrane. The appetite was extremely good, and the digestion apparently naturally performed. Very few cases of this kind are to be found on record, though they are probably not rare in practice. Dr Hope, in his Morbid Anatomy, gives a figure of a perforation of the colon from tubercular affection of the peritoneum; and Dr Baron, in his work on Tuberculous Diseases, relates a case in which the feces were discharged from the umbilicus for some time before death, but the opening in the intestine appears to have been in direct communication with the external aperture.

Dr Sharpey has favoured me with the outline of a case which came under his notice, and which appears, in almost every respect, to be similar with the foregoing, except that part of the feces continued to be discharged by the natural passage. Much fecal matter escaped into the abdominal cavity, and was discharged at the umbilicus.

Abdominal Affections, depending apparently on accumulation within the intestinal canal.

Case 2.—In 1822, J. A., 6 years of age, the son of a professional friend, was brought to Edinburgh by his father for advice. He had been liable to derangement of the bowels for some time; but a year and a-half previously, his complaint had assumed a more serious form. His bowels were sometimes costive, and affected with much difficulty by medicine; at other times his stools were frequent, dark-coloured, slimy, and often tinged with blood. In the course of the complaint he became emaciated, with quick pulse, dry skin, and occasional fits of feverishness. On examining the abdomen, Mr A. discovered a considerable swelling to the right side, and a little above the *umbilicus*. The symptoms became aggravated. Purgatives, with calomel, were given freely, and his mouth was slightly affected; but his complaints did not yield.

On his arrival here he was much reduced, with a pale and emaciated countenance. There was considerable tumefaction on the right side of the abdomen, perceptible both to sight and feeling; the swelling was firm to the touch, and consisted apparently of two distinct portions; he complained of pain in the abdomen, much increased on pressure; the stools procured by medicine were very copious, but of unhealthy colour, and occasionally tinged with blood. He was seen by several medical men, and one of deservedly high reputation considered it one of the most decided cases of mesenteric disease he had ever seen. It was determined, however, to try the effect of leeching, warm-bathing, mild purgatives, and, at his father's suggestion, iodine, which had not at that time been much employed in this country. The application of leeches at first appeared to reduce his strength. His legs began to swell, and evening exacerbations of fever became well-marked. The solution of hydriodate of potass, in doses of four drops twice a-day, was now given, gradually increasing the dose. After persevering in this for some time, considerable amendment was perceptible. The stools assumed a more natural appearance, and though he still continued emaciated, he became more lively. The leeches were again applied; and the warm-bath was used when the pain was severe; the bowels were kept freely open, and the discharge was generally copious. The iodine was increased to nine drops twice a-day; the disease seemed slowly to give way, and the tumours gradually decreased in size, and in eight or nine months not a trace of them was perceptible; his countenance assumed a natural appearance, and he became comparatively stout and well, requiring only attention to the bowels and regulation of food, for his appetite was extremely keen. After some months, he became again unwell, from derangement of the stomach and liver. He was seized at times with severe paroxysms of pain, attended with much noise in the bowels. This continued for several hours, and was only relieved by a free discharge of the contents of the stomach, consisting of undigested food and bilious matter. The stools were clay-coloured and offensive. These symptoms continued for some time, but at length disappeared, and complete recovery took place under the use of calomel and smart laxatives. He is now a healthy young man.

This is not given as a case of recovery from mesenteric disease. My own conviction is, that it was merely accumulation in the colon, giving rise to peritoneal tenderness, and a train of symptoms strongly resembling a more serious malady. It may be doubted whether the iodine produced any decided beneficial effect in this case; but it is quite certain that the action of the bowels became more regular under its use.

Case 3. On the subject of accumulation of the bowels, I may mention a somewhat singular case which occurred in the division of the army to which I was attached in the Kandyan campaign of 1815. On our march from the interior to the coast, during very inclement weather, and with little shelter, the troops began to suffer from dysentery. One very severe case occurred in a young soldier of the 19th Regiment, which resisted all the means employed, consisting chiefly of castor-oil and calomel. There was severe tenesmus, with almost constant discharges of blood and mucus. On our arrival in garrison, he was taken to the hospital, and continued very ill for two days, when a warm water injection was thrown up, which brought away an immense load of Natcheney,—a small hard grain used by the lower classes of natives. He mentioned that he had eaten large quantities of this, in an unboiled state, to satisfy the cravings of hunger. He recovered rapidly.

In the following case an early and careful examination into its nature might have saved considerable suffering.

Case 4. Miss ——, 24 years of age, of sedentary habits, had suffered during the summer of 1825 from severe pain in the epigastric region and right side, stretching to the back and right shoulder. The pain came on in paroxysms, continuing four or five hours at a time; the bowels generally constipated, except when medicine was used. The complaint was alleviated, but not removed, by the means employed. On the evening of the 30th of November, the pain became very severe, and continued so during the night. Next morning, when I saw her, it was felt over the whole abdomen, but more particularly in the right side. The bowels having been costive for some days, she had taken salts, which, according to report, had operated, but not freely. Tongue clean; skin cool, and pulse 70. On examining the right side, a fulness and hardness could easily be felt under the false ribs. It was distinctly circumscribed towards the lower edge, but the upper disappeared under the ribs. It was painful on pressure, but not remarkably so.

Calomel and colocynth, with castor oil, followed up by large enemata, were given freely, but without effect. In consequence of increased pain, headach, slight delirium during the night, flushed face, heat of skin, and full pulse, twenty ounces of blood were taken, which produced syncope. Laxatives and enemata were continued. Third day; no effect from the medicine; skin cool; pulse calm; pain relieved; the swelling not diminished. Two drops and a-half of croton oil, with an injection of turpentine, produced a slight effect on the bowels. Towards evening, a pill of colocynth, containing a drop of croton oil, was given, and repeated in three hours, which produced some very black evacuations. The action of the bowels was kept up by senna and salts, and in a day or two the swelling had entirely disappeared, though occasional tenderness continued to be felt at intervals for some time.

Case 5. *Infantile Bowel Complaint.*—A. B., a boy 10 months old, while at the breast, had been twice attacked with bowel complaint of five or six days continuance. The dejections were generally of a green colour, sometimes consisting of mucus tinged with blood. This yielded to minute doses of calomel, Dover's powder, and castor oil. In other respects, the boy had been thriving. When apparently in good health, he was weaned, which was done without difficulty, as he took his food well from the first. About a fortnight afterwards, I was requested to visit him, and found that, three days before, the bowel complaint, with green dejections, had again appeared. There had been no vomiting, no heat of skin, and he took his food well. For the next three days the dejections were frequent, consisting either of mucus slightly tinged with blood, or of green matter, resembling chopped spinach. There was apparently little pain at any time, nor did pressure seem to produce uneasiness. The abdomen continued soft. The disease went on, the child becoming gradually weaker; at times the purging intermitted for ten or twelve hours, and the dejections sometimes changed to a yellowish colour, but there was never any proper feculent matter. Towards the termination, there was at times a remarkable tossing of the head, with great restlessness. For eight or ten hours he would refuse food, and then take it voraciously. The skin was cool throughout the progress of the disease. There was no vomiting and little thirst till the last stage. Various remedies were tried. Laudanum, in a dose of two drops, produced a deep sleep for ten hours. One grain of the compound powder of ipecacuana produced nearly the same effect. The infant died on the twentieth day, and was examined next morning.

The liver, when cut into, was of healthy appearance, perhaps of a redder colour, and more vascular than natural; gall-bladder excessively distended, with a dark-coloured bile of very viscid tarry nature, which could not be pressed by any force through the duct into the duodenum, though the passage was unobstructed. The stomach was healthy, as also the track of the intestinal canal, till we arrived at the colon, the mucous membraue of which, through the whole extent, was much thickened, of a consistence firmer than usual, and everywhere spotted with very small red specks, as if red sand had been scattered over the surface. There was some fluid between the arachnoid and *pia mater*.

In this case, we had inflammation of the mucous membrane of the colon. It had not proceeded to ulceration; indeed, this does not appear to be of common occurrence, as I have not met with it in the examination of cases of six weeks standing, and the colon is usually found thickened and spongy. Dr Abercrombie has well remarked, that "the most important point in the investigation of this disease refers to the means of distinguishing it in its early stages from the ordinary bowel complaints of children about the period of dentition; and this is often a matter of considerable difficulty. The principal circumstance to be kept in view in the diagnosis is, that it is a febrile disease. The infant is usually hot and restless in the early stages, with thirst; and the tongue is dry, or covered with a brownish crust; there is in general a good deal of screaming and fretfulness, disturbed sleep, frequent vomiting; and, in many instances, pressure on the abdomen appears to give uneasiness."

In the present case there was little fever till towards the termination, and scarcely any pain. An attack apparently of the same nature had twice yielded to simple means. The third proved fatal. When Dr Cheyne published his work on this disease, (*Atrophia Ablactatorum,*) the state of the mucous membrane had not attracted attention, and his observation was directed to the condition of the liver and bile. The success he met with from the use of calomel seemed to confirm his views. Perhaps this circumstance still continues to influence our practice in too great a degree, as we now know that the more serious cases of bowel complaint arise from inflammation of the mucous membrane; and this in our treatment should never be lost sight of. By treating it as an inflammatory affection, we can do more good than when, by trusting to calomel and opiates, we allow the period for active practice to elapse. In systematic works, we are told that the green discharges indicate a superabundance of bile. It may be doubted how far this is correct. In the present case, the discharges were generally green, and the gall-bladder was gorged with thick bile, almost of the consistence of tar; a very common occurrence in the examination of patients who die from dysentery. It is found, however, that a very small quantity of bile in this state is sufficient to colour a great quantity of discharge. In the present case, a very little on the edge of the knife gave a greenish brown colour to a basin of water.

Case 6.—*Destruction of the Gall-Bladder.*—In 1825, I was requested to examine the body of a woman who had died suddenly, and who had not been seen by any medical man. She appeared about 40 years of age, slightly emaciated, with the skin pale and waxy, and the abdomen distended. On laying open its cavity, several very small flakes of lymph were adhering to different points of the peritoneum. On one part to the right, and a little above the umbilicus, there was a larger patch, nearly the size of half-a-crown. The vessels of the peritoneum were neither more distended or numerous than usual. The omentum was completely stretched over the whole of the intestines, and extended into the pelvis. The vessels were loaded with blood, and on one part, corresponding to the patch of lymph already mentioned, a little semipurulent-looking matter was deposited.

On turning back the omentum, a dark-coloured fluid, amounting to several ounces, was discovered on both sides of the abdomen. The duodenum was adhering firmly to the left lobe, and the termination of the right lobe of the liver. A dark fungous-looking substance projected from between them. An aperture in this led to a cavity below the duodenum. The stomach, duodenum, and liver were removed together. The liver was of a smaller size than usual, soft, and flaccid, and externally of a grayish-black colour. The peritoneal coat was rough, and bore marks of ancient inflammation; the internal structure appeared unchanged. The stomach was healthy. A firm adhesion connected the duodenum to the liver for about five fingers' breadth.

On separating this, there was discovered in the situation of the gall-bladder a dark-looking mass, about the size of a small orange, which had no perceptible organization, but resembled putrid blood, and had a small cavity in the centre. The duodenum was then opened; its mucous coat was covered with deep black stains, but its texture was not altered. On its upper surface, the following appearances were remarked. Around a space rather larger than a shilling, the mucous coat seemed to terminate abruptly with a slightly rounded edge, leaving a very superficial pit or depression, which was covered with a membrane somewhat similar to the mucous coat, but thinner and firmer, and more intimately adhering to the subjacent textures. In this depression was a valvular slit, which opened into the fungous mass.

The opening of the *ductus communis* was rather larger and more prominent than natural, and a probe passed readily into the hepatic duct, which was quite pervious. No other morbid appearances were discovered. I regret that circumstances prevented me from obtaining the preparation.

On inquiry into the previous history of this woman, all the information we could obtain was, that six years before she had been afflicted with gall-stones, some of which, her husband asserted, she had passed. Since that time she had been in her usual health, and had a child shortly before her death. He was not aware that she ever complained of pains in the abdomen, or any disorder of the stomach. The only explanation, therefore, of this singular case, appears to be, that a large gall-stone or stones in the gall-bladder had excited inflammation in that organ, and consequent adhesion to the duodenum, and that ulceration had taken place, and the stone passed into the duodenum at the place where the mass was discovered. The gall-bladder had been, by subsequent change, converted into the mass described. From the interior of this it is probable the dark-coloured fluid contained in the cavity had escaped and produced death; but it was extremely difficult to obtain from her husband any satisfactory information on the subject of her previous history.

ART. V.—*Case of Fistula in Perineo of long-standing treated with success.* By A. C. HUTCHISON, F. R. S. (In a letter to the Editor of the Edinburgh Medical and Surgical Journal.)

SIR,—THE treatment of *fistula in perineo* is so apparent, and, as the same time, so easy, safe, and successful in *recent* cases, that we need not here enter upon it. On the other hand, in long-neglected cases, in which the fistulæ are very numerous, extended, and the duration of the disease such as to assure the surgeon that the urinary channels have become cartilaginous tubes, this loathsome disease most frequently has a fatal termination.[*] In reference to the latter class, I have the honour to transmit to you the subjoined case as one of the worst that has fallen under my observation; with the treatment pursued, and its successful termination.—I am, &c. A. COPLAND HUTCHISON.

Early in December 1828, my neighbour, Mr Devonald, called me in to the case of James Wilson, aged 49, residing at 29, Wells Street, Oxford Street, who had laboured under *fistula in perinæo* for about fifteen years; and, during the last twelve months, was wholly confined to his bed. He had not passed any urine through the natural meatus for upwards of a year, and to relieve himself, had been under the necessity of sitting upon a convenience for the greater number of these years, until he had become bed-ridden; and I can never forget the smell that met me when the room door in which he lay was opened;—no stable was ever half so bad. We found him lying upon a rotten mattress soaking in his own urine, which was unconsciously dripping *through thirteen* or *fourteen* fistulous openings in the perinæum, around the anus, through various parts of the scrotum, and two were situated as high as the pubes above the dorsum of the penis, one on each side; while a basin was placed on the floor immediately under him, for the reception of the urine that filtered through his bed. The case, indeed, seemed hopeless; but, notwithstanding which, and his refusal to be sent to an hospital, upon his consenting to submit to whatever treatment might be thought proper, I took him under my own care.

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[*] See Dr Johnston's Medico-Chirurgical Review, Vol. xiv. N. S. Cases occurring at St George's Hospital.

Upon the second attempt, I succeeded in forcing a small probe, with the bulb at the end filed off, through the closed part of the urethra in the *corona glandis*, and which we kept pervious by leaving a portion of bougie in the part properly secured. We proceeded in this way until the 16th December, when I was enabled to pass an ordinary-sized silver catheter into the bladder, which we retained there for a day or two, and then replaced it with one of elastic gum.

After confining the patient as much as we could to low diet from the period I first saw him, and purging him well on the 21st December, on the following morning he was placed in same position as for the lateral operation for stone, without being bound; and the elastic gum catheter being again replaced by one of silver of larger size, (No. 11,) and standing on his left side, I cut down, with a scalpel, through the bulb into the membranous part of the urethra, commencing the incision by the side of the anus, and carrying it forwards upon the catheter, upwards of two inches, assisted by my friend Dr Richardson, the arctic traveller, and Mr Devonald, who held the catheter. In this space no less than five fistulous openings were exposed, and four of them freely laid open by means of a director and bistoury. The external or skin apertures of two of these, through which the urine passed direct from the urethra, were three inches from the nearest part of the first or urethral incision, and the whole of these fistulous channels were hard cartilaginous tubes, from one end to the other.

Judging that enough had been accomplished at one time, we deferred doing more until some progress should be made in the absorption of the cartilaginous channels, and in the filling up of the incisions we had made. Forty drops of laudanum were administered, a gum elastic catheter, sufficiently large to prevent the passage of urine between its sides and the mucous membrane of the urethra, was introduced into the bladder. The bladder was emptied at pleasure by the removal of a small wooden peg fitted to the end of the catheter; and this instrument was secured in its place by proper bandages and tapes, being removed only about every third day, for the purpose of clearing it of mucous and sabulous matter, and then replaced with a fresh one.

The patient passed a tolerable night; but in the morning he was feverish, with a full pulse and flushed countenance. He was bled, therefore, to twenty ounces, a purgative was administered, followed by fever mixture. By which means, and the constant application of warm fomentations to the perineum, the establishment of suppuration in the wounds was accomplished, and with it these unfavourable symptoms disappeared which, for a period of forty-eight hours, were rather alarming.

After a few days the remaining fistulous opening was divided. Red precipitate with burnt alum was sprinkled along each of the cartilaginous channels every other day for about a fortnight, but without the slightest impression being made. With the same view caustics and nitric acid were applied, but with the same results. It may here be proper to mention, that, towards the commencement of the incision,—namely, at the membranous part of the urethra, and about half an inch anterior to the bulb, there was but little cartilaginous matter: Up to this last point, therefore, the catheter was shortly covered with a healthy granulating surface, in which space, however, but one fistulous opening originated.

As the patient's general health was now good, it became necessary to adopt some new plan of local treatment with regard to the removal of the several tracts of cartilaginous matter. Every sort of treatment, local and general, that could be thought of having hitherto failed in destroying them, as has just been stated, some cauterising irons were made under Mr Devonald's directions, of certain conical shapes to suit the channels they were intended to traverse, and which I thought preferable to dissecting them out. These irons were first used about five weeks after the operation with the knife, and repeated every third or fourth day, sometimes at a white heat, but more frequently the heat was only red, and passed rapidly along the channels, carefully avoiding the external skin; and, I confess I was surprised to witness the almost total indifference the patient evinced to its application after the first time, when he was somewhat taken by surprise, and, consequently, the heated iron accidentally touched a portion of skin. After about three applications of the actual cautery there no longer remained any cartilaginous matter; and the rapidity with which the catheter was enclosed and the parts filled up by healthy granulations, was most remarkable.

In about ten days after the first application of the cautery, I carried the incision fully two inches farther forward upon the catheter into a fresh portion of the urethra, cutting upon the *raphe* through the *scrotum*, drawn up over the *penis*; and here again we met with the same cartilaginous matter lining the fistulæ, arising from this last portion of exposed urethra, as from the former, but which gradually lessened in induration as the incision approached the *corona glandis*. Six of these fistulæ arising from this newly exposed portion of urethra were now brought into view, but four only were laid open as before with the bistoury, and the cautery was applied at once to each. The remaining two opening upon the pubis could not, with any safety to the patient, be divided, and instead, small setons of silk threads were passed through each. These two were the last, we were informed, that had shown themselves, and through which only a few drops of urine used occasionally to trickle when lying inclined to the one side or to the other. The same success attended the use of the cautery to the four as on the former occasion; but before we could entirely close this part of the incision, three smaller fistulæ were likewise to be divided; when, after this, and the diminution of the seton by the daily withdrawing of a thread, the parts were at length completely cicatrized and consolidated. During all the various operations not one blood-vessel, requiring a ligature, was divided.

The catheter in this case was retained in the bladder night and day for the first seven weeks, after which it was only introduced at bed-time, and well secured for the night; and, at the end of a little more than three months, Wilson was pronounced cured, voiding his urine in as full a stream as he had ever done, and without the slightest inconvenience of any kind, resulting either from his previous disease, or from the various operations had recourse to. He continued, however, to come to my house once or twice a month for a considerable time, for the purpose of having a bougie passed to satisfy me that the urethra had no tendency to contract; and on inquiry a few months ago, I was informed that he continued well.

To the young surgeon this case presents some practical points requiring particular attention. The first is, that, where the disease may be of long-standing, and the *fistulæ* numerous, the operations should be done in detail and not at once; for had we done so in Wilson's case, the febrile attack was so severe, that we assuredly should have lost our patient. The second is, that the catheter should completely fill the urethra even to stretching, to prevent any urine passing by its side, and to be constantly kept in the bladder until the cure be at least half completed, when it may be removed during the day, charging the patient not to attempt emptying his bladder without the instrument. Thirdly and lastly, the extraordinarily good effects of the actual cautery in cartilaginous fistulæ were very apparent in this case. Without it, we must either have lost our patient, or the operations been rendered wholly abortive. In all my practice I have never witnessed more immediately marked beneficial effects from any remedy in any disease, excepting only after incisions in erysipelatous inflammation. I have also of late years found the occasional application of the cautery very successful in arresting the destructive progress of lupus and other kinds of phagedenic ulcers, and in arresting hemorrhage in situations where circumstances preclude the convenient application of a ligature to the bleeding vessel. The use of this powerful remedy is well known on the continent, where it appears never to have been laid aside, as in England; but the practice of our continental brethren is now become well known and appreciated in this country.

3, Duchess Street, Portland Place,
28th October 1834.

Art. VI.—*Third Medico-Chirurgical Report of the Huddersfield Infirmary.* By William Turnbull, M. D. Physician to the Institution.

Our third annual report commences with July 1833. The influenza, which had been so prevalent during the preceding May, had disappeared, although, in many cases, several months elapsed ere the health was completely re-established. Indeed, the writer even now, twelve months after the departure of the malady, meets with individuals who, although not labouring under any marked disease, have never quite recovered their strength.

July proved dry and seasonable, and presented rather less than the average sickness. Some fever prevailed on Croslandmoor, two miles west of Huddersfield, and also at Thurstonland, —a manufacturing village five miles to the south.

Near the latter place a case of hydrophobia occurred in a boy. It is the only one the writer has become acquainted with in the district, during a residence of twenty years. The disease appeared about six weeks after the bite.

Reports of the cholera having broken out in Liverpool and Manchester now reached Huddersfield; but, as yet, nothing of the kind had presented itself in the town or neighbourhood. On the 7th of August, however, a woman arrived from Manchester, at a lodging-house near the Horse-shoe inn,—a low and confined situation. She was ill when she came, and died, with all the symptoms of cholera, on the morning of the 9th. On that day, a daughter of the lodging-house keeper took ill at 5 p. m.; in a few hours was in deep collapse, and died at 3 p. m. on the 10th. Mr Wrigley attended these cases. On the afternoon of the 10th, the writer visited, with Mr Astin, John Stanley, aged 48, in Denton Lane,—a short distance from the lodging-house. He began to purge and vomit that morning, and, at the time of the visit, was in the blue stage, and only survived until the following evening. He had had, as far as was known, no communication with the preceding cases. The writer likewise saw, with Mr Greenwood, a case on the 13th, which proved fatal, in Silk Street, in the same part of the town. Nothing further occurred until the 20th. On that day, the writer visited, with Dr Wright, John Haigh, aged 42, at Lockwood, a mile south of Huddersfield. He had been seized at 11 A. M., and was found at 9 P. M. in a state of hopeless collapse, with the rice-water fluid trickling from the anus. He died soon after midnight. The wife of this man, at our visit, turned down the bed-clothes, to show us what he had parted with. In doing so she was attacked with vertigo and shivering, and had to run immediately to the closet. Two hours afterwards she began to vomit, and next day was in the stage of collapse. Ultimately, however, she recovered. Her father, who had come to wait upon her after the husband's decease, took ill on the morning of the 24th, and was a corpse in the evening. About this time also, Mr Wrigley saw a fatal case in the Old Post-office Yard,—a very dirty part of the town.

On Tuesday, the 3d September, the author of this report was called, with Mr Greenwood, to visit Mr William Aspinal, a respectable master currier in the town. He had left home for the Isle of Man on the preceding Wednesday. On his arrival there, however, he found cholera very prevalent and fatal. He consequently returned home, which he reached on the Sunday. He then complained of being very poorly, and next day began to purge and vomit, which he continued to do at the time of our visit on the Tuesday. He improved considerably on the Wednesday, and on the Thursday seemed convalescent. About four that morning, however, a servant-girl, aged 17, began to purge, and was a corpse in nine hours. Mr Aspinal was much shocked by this event; got up and drank freely of porter; in the evening had a relapse of the looseness and vomiting; and died next day about 6 P. M. On the night the servant-girl took ill, another female slept with her, but had no symptom of the malady.

On Tuesday, the 24th September, a poor man from Manchester was found in a very low state, with purging and vomiting, a little distance out of town. He was sent into the poorhouse, and attended by Mr Wrigley. He died on the Thursday, the second day after his admission; and, on the subsequent Sunday, a male and two female inmates were seized with the disease. The man, Charles Eastwood, died, and the two women recovered. One of them had nursed the first man during his illness. In addition to these instances of cholera, several isolated cases occurred, and were mostly fatal. Indeed, they were seldom seen by a medical man until the disease had passed into a state of collapse. The weather, during the prevalence of the malady, was exceedingly changeable, and thunder-storms were not unfrequent. After September, no more cholera appeared.

October proved rather a healthy month; the latter half of it was very wet, some days cold, and others close and warm. A few cases of *scarlatina* presented themselves in the town, and here and there a case of continued fever. The writer also met with some dysenteric affections, and cases of tonsillar enlargement amongst children.

November was not characterized by the prevalence of any peculiar malady. Bronchial affections were perhaps the most conspicuous. *Scarlatina* also prevailed about Kirkburton and Emley. The whole month was wet and boisterous. On the 7th, there was a severe storm of thunder, and the 22d and 29th were such days for wind and rain as are seldom witnessed.

December and January were wet and stormy months, beyond any thing the oldest person living could recollect. In the former month there was often thunder, and on the 31st it blew a perfect hurricane, and the rain fell in torrents the whole day. The wind was mostly from the west or south-west. Little sickness prevailed, and that of no peculiar character.

February was dry and mild, and, upon the whole, healthy. The writer attended some fever cases at Foolstone, about seven miles to the south of Huddersfield, and near to Thurstonland, where the fever had prevailed in the end of the preceding summer. In one house seven had the disease, of which one died. All had abdominal tenderness and dry brown tongue. Fever had lingered in the neighbourhood for seven or eight months. The site is elevated, and on a considerable declivity. The houses are also mostly solitary, but generally badly drained; and pools of polluted water are allowed to stagnate at their very thresholds. The medical gentleman whom the writer met in consultation was soon after afflicted with the disease, and laid up for a considerable time.

Throughout March the weather was variable, with cold piercing winds. April was very dry, and a north or easterly wind prevailed the whole month, with occasional sharp frosts. Scarcely any snow fell during the winter. Influenza began in March, and continued most of April. It did not, however, affect adults so generally as in 1833; but children under four years of age suffered greatly, much more so than in the preceding year, and many were carried off by the intensity of the bronchial affection. It was remarked, that those adults who had suffered from the previous epidemic generally escaped. All chronic pulmonary ailments were much aggravated.

May and June were characterized by no special disease, and were healthy months.

With the exception, then, of the limited prevalence of cholera, and the more extended invasion of the bronchial epidemic amongst children, the year embraced by this report has been unusually healthy, and has presented few features of much medical interest. The wet and stormy winter, with almost total absence of frost and snow, had little immediate influence on health. Probably the frequent recurrence of high winds, by dispersing stagnant vapours, and generally ventilating low and confined situations, contributed not a little to this immunity from disease.

The number of in-patients admitted into the Infirmary during the year has been 112; and of out-patients 2246. According to the report of the committee, the number of in-patients is much greater than what is here stated; but this arises from the operation of a rule of the charity, which enforces the renewal of the letter of recommendation every two months. Hence a patient whose recommendation is renewed, is re-entered on the books; and, without the explanation now offered, a very erroneous conclusion, as to the actual number of admissions, and the prevalence of particular diseases, might be formed. Indeed, where a patient has left the hospital uncured, and returned during the same year for the same complaint, the writer has only made one entry of the case. Four or five instances of this kind have occurred during the twelve months. This appears the only way in which perfectly accurate data respecting diseases can be obtained. The expenditure of the year has been L. 1097;—of this sum, however, L. 155 have gone for improvements and repairs.

Table of Diseases of In-patients.

Abscess,		3	Joint, disease of, ankle,	1
Bladder, disease of,		2	shoulder,	1
Bruise,		2	elbow,	1
Bronchitis,		2	Laryngitis,	1
Burn,		1	Liver disease,	1
Caries,		3	Mesenteric disease,	1
Colica,		1	Necrosis,	1
Eye, disease of, amaurosis,	4	11	Neuralgia mammæ,	1
cataract,	3		Nose, loss of,	1
iritis,	1		Paralysis,	5
ophthalmia,	3		Peritonitis,	1
Fistula ani,		2	Psoriasis,	2
Fracture of thigh,	2	5	Rheumatism,	8
——— leg,	3		Rigidity of neck,	2
Gastritis,		1	——— knees,	1
Hœmoptysis,		1	Scrofula,	1
Heart, disease of,		5	Spinal disease,	5
Hydrocele,		1	Tumours,	6
Icterus,		1	Ulcer,	17
Joint, disease of, hip,		5	Wounds,	4
knee,		4	Vomiting,	1

Abscess.—Henry Kinder, æt. 28, from Berry Brow, came under Mr Robinson's care 1st November. On the inner side of the left thigh, near its centre, there was a large soft fluctuating tumour, free from pain and discoloration. A similar one, but of much smaller dimensions, was evident in the same situation on the right thigh. That on the left side had been observed for eight or ten months. It commenced with severe pain in the small of the back, and had slowly attained its present magnitude. No disease of the spine could be detected, and his general health was good. Indeed, he might be called muscular and robust in his appearance. He had tried counter-irritation over the loins, and various applications to the tumours without any advantage. On the 29th three pints of pus were drawn off from the left side; and on the 20th December, half that quantity was taken away. Three pints were obtained from the right side on the 17th January; and on the 21st February about a pint. This latter was not, like all the former, "*pus laeve, album et unius coloris*," but of a glairy and gelatinous appearance. After this no further collection took place; his strength continued good, and he went out, seemingly quite well, on the 8th of March.

Joseph Spivey, aged 10, from Cowcliffe, admitted under the care of Mr Bradshaw, on the 2d of May. He had an extensive swelling round the anus,—exceedingly painful, and of dark-red colour. It had been observed for three weeks; and gradually became larger and more painful. It was freely opened, and some unhealthy purulent matter, mixed with bloody sanies, escaped; but the bottom of the abscess had a foul ragged appearance, and was long in assuming a healing aspect. He went into the country in the end of June, and even then the sore was not quite well.

Bruise.—George Booth, aged 18, from Birkby, admitted on the 28th November, under Mr Robinson. On the preceding day, he had received a severe bruise on the perineum from the end of a cart shaft, which pressed him against a wall, and greatly injured the perineum and scrotum. These parts were much swollen; he had intense pain, and could pass no water. A catheter was with difficulty introduced into the bladder, and a quantity of bloody fluid drawn off. This gave him temporary ease; but much infiltration of the surrounding cellular membrane had taken place; extensive sloughing ensued,—and, notwithstanding free incisions, poulticing, &c. he sunk on the 12th December. There can be little doubt, that, in addition to the extensive contusion, rupture of the urethra had taken place in this patient.

Amaurosis.—Of this disease four cases occurred. Two, Mary Haigh, aged 28, and Mary Schofield, aged 14, were discharged with their sight much improved; Henry Pitchforth, aged 12, died with all the symptoms of hydrocephalus; and Thomas Walton, aged 39, went out as incurable.

Cataract; Venesection and diffuse inflammation of the arm ending fatally.—John France, aged 37, came under Mr Robinson's care October 4th. He laboured under cataract of the right eye; the left had been operated upon some years previously at Leeds, for a similar affection, but no benefit had resulted. On the 10th, the lens, a very firm one, was broken up. Some inflammatory symptoms made their appearance, for which he was bled from the arm. After this the arm became greatly swollen, accompanied with high irritative fever, under which he sunk on the 23d. Both eyes were also inflamed from, it was supposed, the application of gonorrhœal matter, as he was found to have contracted that infection.

Betty Lodge, aged 45, Emley Moor-Head, came into the Infirmary on the 11th April, with cataract of both eyes. Mr Robinson operated upon each, and she went home with a highly useful degree of vision on the 23d May.

Caries.—There have only been three cases of carious bones. For one of these amputation was necessary, viz. John Broomhead. He had long laboured under extensive disease of the tarsal bones. The foot was taken off on the 2d June by Mr Bradshaw. The bones of the tarsus and also the astragalus and *os calcis* were affected.

Fractures.—Of this kind of accident five cases were admitted.

1. William Dearden, aged 8, from Almondbury, had fallen from the top of a hay-stack, and fractured his thigh. He was brought immediately to the hospital, and had a favourable and rapid recovery.

2. Ruth Jukes, aged 14, came in on the 10th August, with compound fracture of the right leg, about one-third above the ankle. It had been caused by her clothes getting entangled in machinery. The cure proved tedious, as she remained nearly six months in the Infirmary.

3. John Parke, from Paddock, admitted 27th September. He worked in a stone quarry, and had his leg broken by a stone falling upon him. It was a simple fracture, but suppuration took place, and formed an external opening, which led to the fractured part, and rendered the cure very slow. He did not leave the house until the 31st January.

4. Samuel Broadbent, aged 67, from Smith-House, was admitted on the 7th October. He had, shortly before, fallen down a ladder, and broken the neck of the thigh bone. He went on well, and was taken home on the 15th November.

5. William Wain, æt. 13, from Burn-Lee, came in February 14. He had received a compound fracture of the leg, a little

above the ankle, three days previously, from the kick of a horse. The limb had been set by Mr Beeley, of Holmfirth. Every thing went on well. He was dismissed in April.

Nose, Loss of.—Job Barber, aged 39, from Lindley, had lost the whole of the projecting part of his nose from syphilis, and was extremely anxious to undergo any operation that held out a chance of lessening so serious a deformity, as he was a loathsome object to all with whom he was connected. The operation was performed on the 5th March, by Mr Robinson. The flap on the forehead was first marked out, then the edges round the nasal cavity were pared, and afterwards the flap raised and turned down. It was held in its proper site by two stitches on each side, and one for the *septum nasi.* Strips of adhesive plaster were next applied, and lastly, the whole was covered with cotton wool. The flap from the forehead fitted the cut edges of the nasal cavity most accurately, and the patient never moved a muscle the whole time of the operation. The first dressing was on the 9th; the part looked well, although very flat. It had its natural colour and heat, and Barber could feel when it was touched. On the 18th all the stitches had come away;—firm union had taken place at the sides, and also with the *septum;* and the bridge of the nose was more plump, and had risen considerably. In this respect it continued to improve during his stay, and, at the period of his discharge, an ordinary observer could scarcely have discovered that any thing had ever been wrong. The nostrils were the most difficult to form. They had a constant tendency to close up. He wore lead tubes, which might be requisite for some time. He left the Infirmary on the 25th April.

Rigidity of the Neck.—David Hampshire, aged 11, from Thornhill, came in as Mr Atkinson's patient. Four years previously, he had been severely burnt on the breast and throat, which had caused great deformity. His chin was drawn down, and fixed firmly to the sternum by a strong band of hard cicatrix. The under lip was everted, and stretched to a great length, so as to reach considerably below the chin, and also bound down to the breast. Indeed his whole face, and particularly his lower eyelids, were much elongated downwards, which, along with exposure of the teeth and gum of his lower jaw, gave him a most unpleasant physiognomy. When he laughed, he might be said to do so with only part of his face, as some parts were so firmly fixed in their unnatural position as not to permit of their joining in the usual expression.

He had undergone an operation in the Leed's Infirmary, and the neck had been set free; but soon after his dismissal, it began slowly to regain its former malposition, and he thought the contraction, at the time of his admission, greater than ever it had been.

He was operated upon on October 4th, by Mr Robinson, in consequence of Mr Atkinson's indisposition. An incision was made across the hardened cicatrix, and the upper half was dissected back to the tip of the chin. The head could then be freely elevated and moved in all directions. The flap made by turning up the upper portion of the cicatrix was then laid down under the chin, the head being kept retracted, and the sides of the wound below where the flap reached were drawn together. Still the lip hung down, exposing the cavity of the mouth nearly as much as ever; and at the suggestion of the writer, a horizontal slip was taken out of the inside of the lip, similar to what is frequently done in *ectropium*, and the wound thus made drawn close by stitches. This produced a very pleasing change in the countenance. A stiff collar was then put on, and worn night and day. Cicatrization was long in being effected in the lower part of the neck, but ultimately it was accomplished, and he retained his head in its natural position. At the end of the year he still remained in the Infirmary, as it was thought prudent to retain him as long as there was any probability of further contraction in the cicatrix.

Wounds.—Benjamin Sykes, aged 18, came in August 21st, with the left arm much injured, by having got entangled in machinery. The whole limb was greatly swollen; gangrene speedily took place, extended to the chest, and he died early on the morning of the 25th.

James Sykes, aged 57, of Marsh, admitted under Mr Wilks' care on the 15th January, had met with rather a singular accident. The apartment in which he worked was so fully occupied by his spinning-loom, that, when he wished to go from one side of the room to the other, he was in the habit of swinging himself across by means of a rope attached to the ceiling. In doing this the rope gave way, and he fell upon his back on some steel spindles, four of which penetrated more or less deeply. When taken off, he felt his right leg numb and powerless. One of the spindles had entered just under the right scapula,—another between two of the spinous processes of the dorsal vertebræ,—and the other three to the left side of the spine. With rest and topical bleeding he quickly recovered the command of his limb, and went out well on the 31st January.

John Wrigley, aged 17, of Birkby, came in with a lacerated wound of the hand, and the loss of one of his fingers; and John Grange, aged 30, from York, with a similar accident,—having lost two of his fingers, and had the hand much torn by a crane. Both patients recovered well.

Table of the Sex and Diseases of In-patients since the opening of the Infirmary.

	Males.	Fem.	Tot.		Males.	Fem.	Tot.
Abscess,	9	2	11	*Laryngitis*,	4	0	4
Aneurism by anastomosis,	0	1	1	Liver, disease of,	1	0	1
Bladder disease,	8	0	8	Mesenteric disease,	1	0	1
Bronchitis,	2	1	3	Necrosis,	2	3	5
Bruise,	11	2	13	*Neuralgia mammæ*,	0	1	1
Burn,	1	2	3	Nose, loss of,	1	0	1
Caries,	8	10	18	Paralysis,	6	5	11
Chorea,	0	3	3	*Periostitis*,	3	0	3
Colic,	1	0	1	*Peritonitis*	0	3	3
Dropsy,	1	2	3	Pneumonia,	0	1	1
Diabetes,	1	0	1	*Prolapsus uteri et vesicæ*,	0	1	1
Erysipelas,	1	0	1	*Psoriasis*,	3	0	3
Eye, disease of,				*Purpura*,	1	0	1
amaurosis,	6	3	9	Rheumatism,	6	7	13
cataract,	4	2	6	Rigidity of neck,	2	0	2
Iritis,	0	1	1	——— knees,	3	1	4
ophthalmia, & corneal				*Scirrhus mammæ*,	0	1	1
opacity,	10	3	13	Scrofula,	0	1	1
Febris,	1	0	1	Spinal disease,	3	8	11
Fistula ani,	3	0	3	Stone,	0	1	1
Fractures,	28	3	31	Stricture of the rectum,	0	1	1
Gastritis,	0	1	1	——— vagina,	0	1	1
Hæmoptysis,	0	1	1	*Testis* enlarged,	2	0	2
Hare-lip,	1	0	1	Tumour,	10	7	17
Heart, disease of,	4	1	5	Ulcer,	15	15	30
Hydrocele,	3	0	3	Varicocele,	1	0	1
Icterus,	0	1	1	Wounds,	6	3	9
Inflamed hand.	2	1	3	Vomiting,	2	0	2
Insanity,	0	1	1				
Joints, disease of,	34	16	50		211	117	328

The male patients, it appears from the above table, are nearly two to one of the females; and the diseases in which they principally preponderate are the following. Out of 11 cases of abscess, 9 are males; and of 8 cases of diseased bladder, all are of the male sex. There have been 29 patients with affections of the eye, and of these 20 are males; and amongst 50 cases of diseased joints, only 16 are females. Accidents, it is natural to expect, occur much more frequently to males than females,—hence, out of 53 admissions for bruises, fractures, and wounds, 45 have been of the male sex.

Amongst the out-patients, on the other hand, many of which come from very slight indisposition, the females are greatly in excess. The table which the writer gave last year of nearly 10,000 out-patients showed how the proportion of the sexes varied at different periods of life. Of the 2246 out-patients admitted during the past year, 717 have come under the author's care; and the subjoined table will show their age and sex. Of 110 of these taken in succession, and all above 8 years of age, 52 were unable to read.

Table of Age and Sex of Out-patients.

	Males.	Females.	Total.
Under 5 years of age,	28	28	56
From 5 to 10,	18	10	28
10 to 20,	35	69	104
20 to 30,	39	71	110
30 to 40,	59	84	143
40 to 50,	43	86	129
50 to 60,	26	51	77
60 to 70,	25	28	53
70 to 80,	9	6	15
Above 80,	2	0	2
	284	433	717

During the year comprehended in this report, Mr John Atkinson, one of the surgeons of the Infirmary, has paid the debt of nature. Mr Atkinson was a native of Huddersfield. He commenced his professional life at the Hull Infirmary, where he served his apprenticeship. Afterwards he pursued his studies in London; and, in 1812, settled in the place of his birth. On the establishment of the Dispensary in 1814, he was appointed one of the surgeons. This office he continued to fill until the Dispensary merged in the Infirmary in 1831; in which latter charity he officiated in the same capacity until his death.

Mr Atkinson was one of the few men who are qualified to excel as an operator. He was gifted with a quick eye, a steady and dexterous hand, and great self-possession. This latter quality enabled him, in the most appalling accidents, where many men of perhaps greater acquirements and mental capacity, would have felt their nerves unstrung, calmly to discharge his duties as in cases of every-day occurrence.

In early life he had suffered amputation above the knee for disease of that joint. Notwithstanding, however, the loss of so important a part, he was extremely active; and until the disease, which ultimately proved fatal, had made considerable inroads on his constitutional vigour, seemed to suffer little from the defect. For several years he had been troubled with dyspeptic symptoms, and his complexion had assumed a sallow unhealthy hue; but it was only about two years previous to his disease that much apprehension was entertained respecting his malady.

About that period he began to have vomitings and great irregularity in the bowels. The vomiting would cease for a time, and again return; and about midsummer 1832, it was of almost daily occurrence. He lost flesh and strength; his tongue was steadily white and furred, except two or three times, when it suddenly became red and flayed in appearance for a week or more, and slowly regained its white coating; his skin was frequently rather hot; and the pulse from 80 to 96, irregular and intermittent. There was likewise much uneasy twisting sensation in the abdomen, with occasional attacks of acute colicky pain. The belly was often tense and tympanitic; and in the epigastrium, rather inclined to the left side, a circumscribed hardness, the size of a large plum, could be distinctly felt. It was tender on pressure; and handling it produced an inclination to hiccup. The bowels were rarely moved without assistance; and the stools were frequently dark and grumous, and emitted a faint fishy odour.

With respect to treatment, nothing afforded more than temporary relief. Mild aperients and emollient enemata always mitigated his sufferings, and a short sojourn at Harrogate seemed once beneficial; but when tried at a later period of the disease, he derived no good from it. Anodynes procured more tranquil nights; and when the abdomen was distended and tympanitic, enemata, with assafœtida, gave him much comfort. Occasional leeching, and various applications to the painful part, were also made use of. Although, however, remedial means mitigated urgent symptoms, and, probably, somewhat arrested the march of the complaint, it was too evident that the malady could not be removed. He struggled on, now a little better, and again worse, during the summer of 1833; but, as the autumn advanced, he declined more rapidly. He was much troubled with hiccup, vomited daily, and the matter vomited had at times the coffee sediment appearance. Much clear saliva flowed occasionally from the mouth, as if he had been profusely salivated; and the cellular membrane generally became distended with fluid. In the commencement of October, he had a bronchial attack, from which he never completely rallied, and gradually sunk on the morning of the 10th, at the age of 45.

An inspection of the body took place on the 11th,—twenty-eight hours after death,—in the presence of nearly all the profession resident in the town. The emaciation was extreme; and a remarkable depression of the sternum extended down the centre, from the top to the ensiform cartilage. This must have been congenital. On turning down the abdominal parietes, a liver of more than ordinary size came into view, from the surface of which several large yellow tubercles projected. Some were as large as a moderate-sized plum. When cut into, they were firm and homogeneous at the circumference, and gradually became less consistent towards the centre, where they resembled thickish cream, of a yellow colour. They arose from the surface of the organ, which internally seemed perfectly sound. It weighed three pounds and six ounces. The left lobe, which quite overlapped the stomach, had a large tubercle projecting from its anterior aspect. This was the tumour which had been observed during life. The gall-bladder seemed healthy and full of bile. Very firm adhesions, which could only be separated by the scalpel, existed between the stomach and the under surface of the liver. The former organ was large,—the pyloric orifice contracted to a very small aperture,—and its parietes much thickened and hard, but not ulcerated. The other abdominal viscera were sound. The unusual configuration of the sternum encroached considerably on the space generally occupied by the heart and lungs;—adhesions were found between the *pleura pulmonalis* and *costalis*;—and the upper part of the right lung was full of tubercles.

Mr Atkinson was succeeded in his office of surgeon to the Infirmary, after a keen contest, by Mr John Taylor Bradshaw, son of one of the oldest surgeons in Huddersfield.

Besides Mr Atkinson, another member of the profession, James Bradley, M. D., has lately been taken from amongst us. Dr Bradley had been in practice half a century. He was a native of East Keswick, near Leeds, and commenced his studies at the latter place, by attendance at the Infirmary. He also resided some time in London; and, while very young, commenced as a general practitioner at Almondbury,—an ancient and populous village nearly two miles south of Huddersfield. There he practised with great repute not much short of thirty years. Having thus, with unceasing toil, acquired a moderate independency, he removed about 1810 to Huddersfield, with the view of confining himself to consultation-practice; and, thinking it might aid him in this respect, he obtained, on the recommendation of the late Dr Hird of Leeds, and the late Dr Jefferson of Pontefract, the degree of M. D. from Aberdeen. Had this ancient seat of learning never conferred her favours on less worthy objects, perhaps her modern repute might have stood higher; for, assuredly, if such a royal road, "*ad summos honores medicinae*," be ever allowable, it is to a veteran in the service, who, like Dr Bradley, has raised himself from obscurity to no inconsiderable altitude in

> ———— "the steep
> Where fame's proud temple shines afar."

Dr Bradley contributed a good many valuable papers to the London Medical and Physical Journal. In volume 5th will be found some surgical cases and remarks; in volume 16th is a paper on hernia, and another on the same subject in volume 24th, where he advocates the return, in many cases, of the sac unopened. In the same volume there is a communication on what is termed venous aneurism, in which he differs with the late Mr Hey as to the nature of some of the cases of *fungus hæmatodes*, published in that gentleman's work; and volumes 25th and 27th contain each an excellent practical contribution upon epidemic puerperal fever. He likewise published in 1818, a work of merit on Spinal disease. Dr Bradley aided greatly in the establishment of the Dispensary, in which he held the office of physician for only two years, as he found its duties too arduous for his state of health. The doctor was a minute and faithful observer of disease,—reflected much on what he saw,—and, by a careful analysis of symptoms, excelled in that most difficult part of medicine, diagnosis. He was a man of ardent feelings and strong attachments; simple and unostentatious in the extreme in his habits; and has left few equals in professional honour and talent.

For many years, Dr Bradley had suffered intensely from a harsh, ringing, dry cough, with wheezing inspiration, in the mitigation of which nothing but warmth seemed of any avail, and which invariably underwent aggravation on the slightest exposure to cold; he had also great irritability of bladder, and severe headachs. Four or five years prior to his decease, he was seized, after great mental irritation, with weakness of the right arm. This gradually increased, and incapacitated him for writing. His mental faculties likewise began to fail. His speech became mumbling and indistinct, and for almost the two last years of his life, whilst surrounded by all the attentions that could possibly be paid him, he seemed little conscious of anything. It may be worthy of remark, that, as the lingual paralysis and mental decay advanced, the cough, with difficult respiration, and the extreme sensitiveness to cold, entirely disappeared. For about a week before death, he laboured under a bronchial affection, which terminated in effusion, in his 74th year.

The upper division of Agbrigg, of which Huddersfield is the principal town, contained in 1811 a population of 68,000; this, in 1831, had increased to 103,000. The number of regular medical practitioners in the same district was, in 1814, 22; and now, July 1834, there are no less than 46 legitimate sons of Æsculapius; so that, twenty years ago, there was a medical man for about every 3100 inhabitants, while now, there is one for about 2240. There have been ten deaths in the profession since 1814; three of these have arisen from *phthisis*; two from disease of the head; one from *bronchitis*; one from enlarged liver; one from tuberculated liver and *scirrhus pylori*; one from *enteritis*; and of one, the cause of death is unknown to the writer; but probably it was some affection of the heart or large vessels, as the individual expired very suddenly and unexpectedly.

Dr Bradley was the only individual amongst the ten who could be said to have attained old age. Not more than one of the others exceeded his 50th year, and five had not reached the 40th. This is a melancholy history of the longevity of the members of that profession whose province it is to mitigate the sufferings, and lengthen the days, of man.

Huddersfield, 30th September 1834.

ART. VII.—*Case of Hydrocele, followed by Hematocele and Ascites.* By WILLIAM GARDEN, Surgeon, Alford, Aberdeenshire.

JAMES WEBSTER, aged 23, of a spare habit and sallow countenance, applied to me on the 5th of August 1833, about a swelling in the left side of his scrotum. The swelling measured about eight inches in length, and twelve in circumference. It felt light when lifted in the hand, and fluctuation could be perceived; but no transparency was observed by examination with a lighted candle. He stated that the swelling had commenced, about a year previous to the time that he consulted me, at the lower part of the scrotum, and that it had gradually attained to the size which it then presented. Being convinced from the symptoms, that it was a hydrocele, and having no trocar at hand, I made a puncture with a lancet in the usual situation, and introduced the end of a female catheter, to prevent the fluid from getting into the cellular membrane. The fluid was of the usual straw-colour, till the latter part of it was escaping, when it became tinged with venous blood. After withdrawing the catheter, venous blood flowed profusely from the wound, when the scrotum was pressed by the hand. Compression, and the application of cold water to the scrotum, accompanied by the recumbent position, were tried, and appeared to stop the hemorrhage.

I was called to Webster next day, and found that the swelling had nearly attained its former size. It felt heavy and more solid, though some degree of fluctuation could still be perceived. It was then evident, that the hemorrhage had continued, and that, though I could not exactly ascertain its source, it flowed into the *tunica vaginalis*. As the swelling was still increasing in size, and as my patient complained very much of pain along the spermatic chord, I resolved again to puncture it, in order to relieve him in some degree, and, if possible, to ascertain the source of the hemorrhage. I removed the compress and adhesive plaster, and after laying the puncture open, a considerable quantity of fluid blood escaped. I pinched up the scrotum, with a finger on each side of the wound, in order to ascertain if the hemorrhage proceeded from any vessel divided in the puncture. On removing my fingers, after having held the sides of the wound for several minutes, about an ounce of fluid venous blood flowed in a jet. I then concluded that the hemorrhage could not have proceeded from any vessel in the puncture, while I pressed its sides with my fingers, but that it must have come either from some of the spermatic veins, or from some of those of the *tunica vaginalis*, which were enlarged and ruptured.

Compression was again applied by means of a bandage fixed round the pelvis, accompanied by the recumbent position, and the constant application of cold water to the scrotum.

These means appeared to have retarded the hemorrhage, but in the course of four days the swelling had attained its former size. He complained much of tension and pain in the swelling, shooting along the spermatic chord to the loins. I proposed to lay open the *tunica vaginalis*, but my patient would not consent. I again punctured the swelling, and had recourse to the same applications as formerly, but with the same bad success. I then saw no alternative but the operation for hematocele, to which my patient consented. With the assistance of my friend, Harry Henderson, Esq. surgeon, Insch, I performed the operation on the 14th August, nine days after the swelling was first punctured.

I made an incision, about five inches in length, down to the bottom of the tumour, cutting through the puncture in its course. Having laid the *tunica vaginalis* open, a large quantity of fluid blood escaped, and after removing some clots which remained, we found the veins of the *tunica vaginalis* very much enlarged and varicose; some of them were of the size of a small goose-quill. The *tunica vaginalis* and integuments of the scrotum were very much thickened. The testicle was healthy and of the natural size. We examined the situation of the puncture, and the inner surface of the *tunica vaginalis*, and discovered that one of the varicose veins, near the lower part of the swelling, was ruptured. We tied two arteries of the scrotum, which bled profusely; but there still being a considerable venous hemorrhage, and our object being to heal the wound by granulation, we applied a compress of lint between the edges of the wound, and secured it by straps of adhesive plaster. The patient was relieved from the excruciating pain and feeling of tension which had so much annoyed him. After ascertaining that there was no hemorrhage, we left him, desiring the attendants to keep a cloth wet with cold water constantly on the wound.

15th August. He had slept a little during the night, and felt more ease than he had done since the swelling was first punctured. He complained slightly of pain shooting along the cord. Pulse, 80. The bowels had not been opened since the operation. I ordered a dose of Epsom salts to be given, and a poultice to be applied over the wound.

16th. He had not slept so well as on the preceding night, and complained more of pain shooting along the chord, and in the loins. The bowels had been opened by the purgative. I removed the lint from the wound, and found the testicle and scrotum considerably swelled, but there was no hemorrhage.

I ordered twelve leeches to be applied round the edges of the wound, and the poultice to be continued.

17th. He had passed a restless night, and the *scrotum* was so much swelled as to bury the *penis.* From the swelling of the *scrotum* pressing on the *urethra,* he could not void his urine. With some difficulty an elastic gum catheter was introduced into the bladder, and about a pint of urine drawn off. I ordered the leeches to be again applied to the scrotum, and a dose of Epsom salts to be given next morning.

18th. The swelling of the scrotum had subsided considerably after the leeches, and he could void his urine, but it was high-coloured, and in small quantity. He complained of severe pain in the back and right side; and upon examining the latter, I found in the region of the liver hardness and enlargement, and tenderness on pressure. The tongue was white; and the pulse 90, and hard. I bled him from the arm to about sixteen ounces, and ordered a dose of calomel and jalap.

19th. The blood was buffed and cupped; the purgative had operated. There was no pain in the scrotum or cord; granulations were forming on the testicle and edges of the wound. The pain in the side was relieved after the bleeding and purgative. The urine was still high-coloured and in small quantity; tongue cleaner; pulse 86, not so hard as on the 18th. There was still enlargement and tenderness in the right hypochondrium. I ordered eighteen leeches to the side, and a dose of calomel and jalap next morning.

20th. He had slept a little during the night. The purgative had operated. He felt no pain in the side, excepting when it was pressed. Tongue clean; pulse 80, and compressible. The wound was healthy; the urine was still in small quantity, and there was a diffused fulness of the abdomen. I ordered a blister to the right hypochondrium, and half a drachm of compound powder of jalap to be given next morning.

21st. The blister had risen, and the purgative had operated briskly. He had slept well till towards morning, when the blister annoyed him a little. He felt quite free from pain; but there was still fulness of the abdomen.

22d. The symptoms were much the same, but the fulness of the abdomen had increased, and fluctuation was perceptible. I ordered five grains of blue pill to be taken night and morning.

23d. The wound was granulating and healthy. The other symptoms were much the same. I ordered the poultice to be discontinued, and the wound to be dressed with simple ointment.

25th. The fulness of the abdomen was much increased. The blister was healed, and there was no tenderness on pressure.

27th. The symptoms were much the same.

29th. The fulness of the abdomen was still increasing, and fluctuation was quite perceptible.

September 1st. The wound was healthy, and the granulations from the testicle were adhering to those of the scrotum. The size of the abdomen had not increased since last visit. The gums were sore.

4th. There was profuse salivation. The circumference of the abdomen was less by two inches since last visit. I ordered one pill at night only.

8th. The circumference of the abdomen was much the same. The urine was still in small quantity. He refused to take more pills.

12th. The wound was nearly whole. The circumference of the abdomen was diminished by four inches since last visit. The mouth was still sore.

16th. The wound was whole, and the scrotum was nearly of the natural size. The circumference of the abdomen was much the same as at last visit. The mouth was still sore.

20th. The fulness of the abdomen was much increased since last visit.

I again tried mercury, and afterwards hydragogue purgatives and other medicines, but without any permanent effect. The quantity of the fluid so much increased, that, by the middle of October, I found it necessary to perform paracentesis, and I repeated the operation monthly till April last. It is now six months since the last operation. He enjoys tolerably good health, but there is still a little fulness of the abdomen.

In looking over this case, the first thing worthy of notice is the instrument with which the puncture was made. A trocar is always preferable to a lancet for puncturing a hydrocele; but in this case the effect would have been the same, as the hemorrhage did not proceed from any vessel in the situation of the puncture. If it had, the fluid of the hydrocele would have been tinged with blood from the first; but in this case no blood flowed, till the latter part of the fluid was escaping. While I held the sides of the wound, the blood still flowed into the *tunica vaginalis*, which also showed that the hemorrhage did not proceed from the puncture, as the operation afterwards proved. The contraction of the scrotum, after the evacuation of the fluid, had obstructed the circulation in the enlarged and varicose veins of the *tunica vaginalis*, and in consequence, one of them had burst. As compression could not be effectually applied to the scrotum, the operation of laying open the *tunica vaginalis*, and applying compression directly to the source of the hemorrhage, was had recourse to. This operation not only enabled me to stop the hemorrhage, but also effected a radical cure of the hydrocele, by producing adhesion, by means of granulation of the *tunica vaginalis* of the testicle to that lining the scrotum.

The connection of the hydrocele with the ascites which followed appears to have been accidental, as there was no communication between the abdominal cavity and that of the *tunica vaginalis.* Webster stated that he had had enlargement and occasional pain in the right side for several years. The enlargement of the liver accounted for the ascites; and probably the excitement of the circulation after the operation had produced in this organ, already in a state of disease, some degree of inflammation. This inflammatory state was subdued by general and local bleeding, with counter-irritation. The enlarged and hardened state of the liver, and, as a consequence, the obstructed circulation in the *vena portae*, which returns the blood from the principal viscera of the abdomen, sufficiently accounted for the effusion into that cavity.

As mercury and the other medicines usually given in ascites had no permanent effect upon the disease, and as they were affecting my patient's general health, I discontinued them, and left the case to nature, excepting that the fluid was occasionally drawn off, when, from its pressure, it affected the functions of the respiratory organs. In proportion as my patient regained his usual health, the fluid in the abdomen increased more slowly. It is now about six months since the last operation, and though there be still enlargement in the right hypochondrium, and more than natural fulness of the abdomen, my patient is in tolerably good health, and able to follow his usual employment.

Alford, *25th October* 1834.

ART. VIII.—*Report of the Edinburgh Eye Infirmary.* By ALEXANDER WATSON, Esq. Fellow of the Royal College of Surgeons, and Surgeon to the Institution.

IN submitting to the profession the first Report of the Edinburgh Eye Infirmary, a short statement of its objects may be premised.

The two great objects of the Edinburgh Eye Infirmary are, *first*, the *relief* of those labouring under diseases of the eye and its appendages; and, *secondly*, the *instruction* of medical students in the nature and best modes of treatment of this class of diseases.

To accomplish the first of these objects, this Institution has been founded on the plan which has been successfully, and with great benefit, adopted in the case of the London Eye Infirmary, the Royal Westminster Eye Infirmary, the Glasgow Eye Infirmary, and many others in different quarters. The plan alluded to consists in giving advice and supplying medicines to persons labouring under diseases of the eye, and who are able to attend at the Institution at stated periods; and, at the same time, having a few beds in the house for the proper accommodation of those whose cases are of such an aggravated or important nature as to require the quietness, attention, and conveniences of an hospital for their recovery.

This conjunction of the benefits of a dispensary and an hospital is extremely well adapted for the treatment of ophthalmic diseases; both on account of the greater number of the cases not requiring the confinement of an hospital, and a large proportion of the patients being children under eight years of age, who are often not easily managed when away from their parents. The hospital department, again, is indispensable to the lower ranks, either for the successful treatment of many distressing cases, requiring much attention and care to prevent the loss of sight, or the performance of operations for the restoration of this faculty.

The Edinburgh Eye Infirmary is open daily at eleven o'clock for the admission of patients, when the medical officers and pupils are in regular attendance. This arrangement has many advantages. The in-patients are seen and prescribed for daily, as well as those out-patients, whose cases are of an acute nature, and may be undergoing frequent and rapid changes. The out-patients, who do not require to attend daily, are divided between different days, which prevents the cases from being too numerous for the time which can be daily allotted to the visit; and, lastly, it enables those who do not require to attend daily, and who might be prevented from attending on particular days, (from the state of the weather or other causes,) to attend when most convenient for themselves.

As yet, it has only been cases requiring operations for the restoration of sight that have been admitted into the house as in-patients. But there are many cases of violent inflammation, threatening the destruction of the eye as an organ of vision, which it would be very desirable to receive into the house, did the circumstances of the Institution admit of it.

For the instruction of medical students in this branch of the profession, the other great object of the Edinburgh Eye Infirmary, it is open to the attendance of a limited number, on payment of a small fee to its funds. These students not only see the cases, and have their nature and treatment explained to them, but they have also the advantages of a considerable collection of preparations to assist them in studying the anatomy and diseases of the eye. It is further contemplated to deliver annually, at least one course of about thirty lectures, on the anatomy, physiology, and diseases of this organ.

Having shortly stated the objects of the Edinburgh Eye Infirmary, I shall now mention some of the reasons which induced me to commence it.

I felt that such an institution was much wanted, from the number of poor patients labouring under these diseases who applied to me for relief. And having for many years devoted more than ordinary attention to this, my favourite pursuit, I felt anxious to render my services readily available to those who might require my assistance. This, I conceived, could be best accomplished by such an establishment; as being not only the most convenient and agreeable arrangement for the patients and myself, but the only way in which *justice* could be done, either to them or to me, in the treatment of their cases. For, the houses of the lower orders are not only ill suited to the performance of, and recovery from, the more important and delicate operations on the eye; but in their after-treatment, such patients require to be removed, for a time, from the noise and bustle of their families, to situations in which they can obtain the necessary quiet and attendance for their favourable recovery; and it is in general not less indispensable, that they may be placed completely under the control of their medical attendant, and prevented from getting any thing which might prove hurtful to them.

To numerous poor persons, also, who annually come from different parts of the country to undergo operations for the restoration of their sight, and who are recommended to my care, I felt that an Eye Infirmary, into which they could be admitted, would be of great importance, and was much wanted, having very often been obliged either to provide lodgings for such individuals, or to decline rendering to them my professional services.

The approbation which my plan in commencing this Institution has obtained from the chief part of the profession in Edinburgh, both before and since it has been opened, is one of the most gratifying and encouraging circumstances which have occurred in its brief history.

Another important reason for establishing an Eye Infirmary in Edinburgh, was the institution of a School for ophthalmic surgery, a branch of professional education to which, in this place, sufficient attention has not hitherto been devoted. The sentiments which I entertain on this subject have been so ably stated by that justly celebrated surgeon, Mr Lawrence of London, that I cannot do better than quote his own words.

" It often depends on the surgeon whether the patient shall retain or lose, recover or remain bereft of vision. Common external inflammation of the eye, if neglected or improperly treated, by rendering the transparent anterior portion of the organ more or less opaque, proportionally injures vision; inflammation of the iris, when unchecked, causes contraction of the pupil and deposition of lymph in the aperture, which prevents the passage of light into the eye. Affection of the nervous structure, if not arrested in its beginning, terminates inevitably in diminution or loss of sight. Such distressing results have too often been promoted by modes of treatment, in favour of which the sanction of names that have enjoyed public confidence might be adduced. The success of operations for cataract, or artificial pupil, depends entirely on the knowledge, discrimination, and dexterity of the operator. The cases now alluded to are matters of daily occurrence, and make up the bulk of ophthalmic practice. The serious responsibility, which this view of the subject unfolds, will impel every conscientious man to turn his anxious attention to the affections of this important organ, and to embrace all opportunities of acquiring that knowledge which will enable him to act decisively and effectually on occasions of such momentous consequence.

"If there are any, to whom the pleasure connected with the acquisition of knowledge, the satisfaction flowing from the consciousness of important duties rightly performed, and the gratitude so warmly expressed, for the inestimable benefits of averting blindness, or restoring sight, should not prove an incentive sufficiently powerful to the study of ophthalmic medicine and surgery, their case must be deemed desperate; unless, indeed, their minds, insensible to higher feelings and nobler motives, should obey the impulse of self-interest and fear; unless they should be affected by the prospects of disgrace and injury, which ignorance and its inseparable blunders must entail. The consequences of wrong treatment cannot be concealed here, as in the obscure affections of internal organs; the visible changes of structure are obvious to external observation, and the unfortunate individual, whose sight is injured or destroyed by unskilful treatment, serves as a lasting memorial of the incapacity and rashness to which he owes his misfortune. The study of diseases of the eye is therefore now justly regarded as an essential part of general medical education; but it is more particularly so to country practitioners, who are thrown entirely on their own resources; who cannot, as in the metropolis, and some large cities, call in the aid of superior talent and knowledge.

"Although the importance of the subject must be admitted, it may be doubted whether the ophthalmic branch ought to be separated from the rest of medicine and surgery, as it must be, to a certain extent, by devoting to it separate courses of lectures and treatises, and by instituting ophthalmic hospitals. The diseases of the eye, in general hospitals, are inadequate, from the smallness of their number, to the purposes of practical study, particularly that of exemplifying the various operations. Thus these institutions have been inefficient in reference to this important department.

" It thus became desirable to establish an express and distinct school for ophthalmic surgery; not because the principles of treatment differ from those applicable to disease in general; nor because any peculiar mode of study is required; but in order to supply a deficiency in the existing sources of professional instruction; to provide, for the diseases of this important organ, those means of information which the general hospitals neither do, nor could provide consistently with the requisite attention to their other important objects. This proceeding, which at first view seems calculated to complete and perpetuate the separation, was the only rational mode of reuniting ophthalmic practice to general surgery.

" The opportunities afforded at ophthalmic hospitals are not intended nor calculated to make oculists; but to impart to surgeons and physicians a knowledge of ophthalmic disease."*

With these views, so well expressed by Mr Lawrence, the greater part of the profession will readily accord. My reason for conceiving that an Eye Infirmary would prove advantageous to medical students, was not that the diseases of the eye were either neglected or overlooked by the teachers of general Surgery, but because the extent, the complexity and importance of the subject now require more attention than could be devoted to it in these surgical courses. Mr Lawrence delivered at the London Ophthalmic Infirmary a course of thirty Lectures on the Anatomy, Physiology, and different Diseases of the Eye, and their appropriate treatment, which were reported for a considerable time in the pages of a periodical work, and the substance of which, when condensed and rectified in a subsequent republication, have occupied a large and closely-printed octavo volume. It is also well known, that on the continent very complete courses of Lectures on Ophthalmic Surgery are delivered by the most eminent ophthalmologists of France, Germany, and Italy; and that the celebrated Professor Beer of Vienna delivers a course of lectures on the subject occupying ten months, the lectures being delivered five or six times a week. Now, as the courses of surgery taught here consist each of about 100 lectures, it is evidently impossible to devote the necessary attention to the diseases of the eye without neglecting other important subjects.

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* See Lawrence on the Eye, p. 2, 3, and 4.

The sources from which it is expected that the necessary funds will be obtained for the maintenance of this Institution are;—1*st*, Contributions and donations from benevolent individuals; 2*dly*, The proceeds of an annual charity sermon; and, 3*dly*, The fees obtained from medical students for their attendance. By the kindness and liberality of my friends, the Treasurer has already received L. 117, 7s. 6d.

If the plan which has now been successfully commenced, shall continue to prove useful to the public, and if I shall have been instrumental in filling up a deficiency which appeared to exist in this city, so celebrated for other departments of the medical profession, I shall feel amply rewarded for my labours.

The number of cases which have been admitted into the Edinburgh Eye Infirmary, from the 1st of July 1834, the time of its being opened, till the 20th of November, has been 268 altogether. Of these, eleven have been admitted as in-patients; the rest were placed in the books as out-patients, some of whom were visited at their own dwellings. Many of the individuals were affected with diseases in both eyes, which, in some, were of a different nature; so that the number of cases of disease of the eye admitted into the institution was considerably greater than the number of patients above stated. The number of patients affected with each disease were as follow.

Inflammation of eyelids (simple),	1	Inflammation of conjunctiva (purulent),	5
Do. erysipelatous	2	Strumous ophthalmia,	27
Ophthalmia tarsi,	36	Inflammation of cornea,	14
Eversion of eyelid,	2	Opacities and specks of cornea,	15
Inversion of eyelid,	1	Ulcers of cornea,	20
Tumours of eyelids,	4	Staphyloma of cornea,	10
Do. lacrymal caruncle,	1	Do. and sclerotica,	2
Ecchymosis of eyelid and ball,	1	Iritis,	10
Spasmodic affection of muscles of eye,	1	Closed pupil,	11
Paralysis of muscles of eye,	1	Inflammation of retina,	1
Fistula lacrymalis,	7	Amaurosis,	25
Injuries of eyeball from foreign bodies,	8	Cataract, single and double,	17
Inflammation of conjunctiva (acute and chronic),	40		

The following list exhibits the number of cases in which operations have been performed for the removal of cataract, the liberation of closed pupil, the cure of fistula lacrymalis, &c.

	Operations for cataract.	By Extraction.	By Needle.
Lawrie,	2	1	1
M'Laren,	2	1	1
Reid, Leith,	2		2
Rankine,	1	1	
Wright,	1		1
Cooper,	1	1	
Thomson,	1	1	
Ramsay,	1	1	
Slimmon,	1	1	
	12	7	5

Artifical pupil.	
M'Pherson,	1
Wright, .	1
M'Candlish,	1
Henderson,	1
	4

Fistula lacrymalis,	2
Enlarged lac. caruncle,	1
Tumours of lids,	2
Vascular speck,	4
Inversion of lids,	2
Ex. of foreign body,	3
Pterygium,	1
	15

Number of cases	cured, - -	151
	relieved, -	37
	incurable, - -	34
	irregular, -	13
	under treatment, -	33
		268

Remarks on the most important of the above cases.

1. *Fistula Lacrymalis.*—Of this disease seven cases occurred. The most of these consisted of chronic enlargement of the lacrymal sac, from obstruction of the nasal duct, and accompanied with purulent secretion from the membrane lining the sac. In these cases the complaint had existed for several years, during which time the patients relieved themseves periodically by pressure on the tumour, by which its contents were evacuated through the *puncta lacrymalia.* In several of these the complaint was cured by simply introducing into the eye a solution of sulphate of zinc, or nitrate of silver, which found its way through the lacrymal *puncta* into the lacrymal sac, and thus produced beneficial effects on the diseased lining membrane. In two cases a cure was accomplished by the introduction of Ware's style. In one of these, it was introduced through a spontaneous opening which had taken place in the sac; in the other, an opening was made with a knife. The obstruction in the nasal duct was easily overcome in both cases, and the style was worn for two or three weeks.

2. *Injuries of Eyeball from Foreign Bodies.*—These injuries had been received upon the cornea in each of the cases which presented themselves. This forms a very interesting class of cases, from the important results which often ensue. The degree of importance of the injuries appears to depend on the depth to which the cornea and eyeball have been penetrated, and the degree of contusion of the eye which has been received at the same time. In several of the cases, loss of vision resulted from the inflammation which followed the accident, without the whole thickness of the cornea being penetrated by the wounding body, by closing of the pupil and opacity of the lens having supervened. Examples also occurred of the important changes which occasionally take place after injuries of the eye, consisting of opacity and absorption of the

lens, *hydrophthalmia*, and atrophy of the eye. On these I purpose to dilate more fully in the next report.

3. *Inflammation of Conjunctiva, acute and chronic.*—These cases have been enumerated together, because they may be considered to consist of two different stages of the same disease. In the first, or acute stage, simple antiphlogistic treatment, consisting of local bleeding by cupping and leeches, warm fomentations with decoctions of poppy heads, and, at an after period, the solution of the acetate of lead, with gentle purgatives, were the means, in general, successfully employed. In the chronic stage, in which the inflammation appears to be of a passive nature, gentle stimulants, consisting of opium wine, solution of nitrate of silver, sulphate of zinc, and a weak red precipitate ointment, were employed with success.

4. *Strumous Ophthalmia, Inflammation, Opacities and Ulcers of Cornea.*—These affections were all very similar in their nature, and frequently blended together in the same case; and they seemed severally to be modifications of the same disease, viz. strumous ophthalmia. The inflammation accompanying them was in general of a chronic nature, but generally assuming alternately an active and a passive state. For the acute or active stage, warm poppy fomentations and purgatives were employed with great benefit; in the other, gentle stimulants, consisting of solution of nitrate of silver, muriate of mercury, sulphate of zinc, or wine of opium, were employed. To pustules about the margin of the cornea, a very common occurrence, the application of a pencil of nitrate of silver proved the most speedy mode of accomplishing a cure, one or two applications being sufficient. To deep or irritable ulcers of the cornea, a strong solution of nitrate of silver was generally applied by the point of a hair-pencil;—the application of this substance in a solid form, in such cases, being in general objectionable, on account of the great danger there is of causing an opening into the anterior chamber with it. After the application of the strong solution of nitrate of silver in cases attended with much increased vascularity, warm fomentations were generally applied with great relief; so that after a few such applications, at intervals of two or three days, the cicatrization of the ulcers was accomplished. The most tedious and troublesome cases of strumous ophthalmia which occurred were those in which a deposition of lymph took place between the layers of the cornea from inflammation of its middle layer. In these cases, at first the antiphlogistic treatment, and afterwards, the application of gentle stimuli, were most beneficial; but whether the case terminated in the formation of an ulcer or not, a degree of permanent opacity was often the result. In four cases of

corneal opacity, upon which red vessels were ramified from the conjunctiva, I divided their trunks by the excision of a small portion of them with the most complete success. In two of these cases the vascular speck had existed for several years, harassed the patients with pain and intolerance of light, which prevented the use of the eyes, and had resisted every other treatment which was applied. The vascular speck appears to be the result of the healing process during the cicatrization of an ulcer on the cornea, by some of the inflamed vessels remaining permanently enlarged. One of the most remarkable symptoms of strumous ophthalmia, and which occurred to a great degree in several of our cases, was the intolerance of light. It is often curious to observe the great care of the patient to exclude every particle of light. This symptom is attended with copious lacrymation and contraction of the pupil. It does not occur in all cases, nor is it confined to the worst, but often exists where the affection appears to be slight, and it continues for weeks or months. It does not appear to depend on the state of the cornea, as this part is sometimes transparent and unaffected. As this intolerance of light does not appear to be caused by acute inflammation, it is not in general to be considered as an indication of an alarming nature. I have often observed it to be worst in the most squalid wretched-looking children, and to be greatly mitigated by more nourishing diet, with attention to the state of the stomach and bowels, by giving tonics and laxatives. It is also of great importance in such cases to attend to the state of the eyes, and gradually to induce the patient to accustom them to the light; for I have little doubt that the intolerance of light is aggravated by its complete exclusion for a length of time. There also seems to be a spasmodic closing of the *orbicularis palpebrarum* muscle, which appears to be lessened by warm bathing and wine of opium.

In two cases of ulceration of the cornea, an opening formed into the anterior chamber, and formed what I have described as a *fistula corneæ*. In one of these the iris protruded. They both recovered. In another case the fistulous opening continued.

5. *Iritis.*—Ten cases of acute inflammation of the iris occurred. The whole of them seemed to be connected with venereal disease, and most of them were accompanied with other secondary symptoms. Though the inflammation in most of these cases affected both eyes very severely, and were attended with effusions of lymph, they all recovered without loss of sight. The treatment of these cases consisted of antiphlogistic remedies and belladonna, followed by mercury. In several of them the antiphlogistic treatment without mercury had been fairly tried for a

considerable length of time (in one case for 5 weeks) both before and after their admission to the Infirmary, but without giving a decided check to the progress of the disease. But after the mercury was given, whenever it affected the mouth, the disease of the eye was not only arrested, but speedily abated; so that nothing could be attended with more highly beneficial effects than the mercury appeared to be in these cases. And I feel strongly convinced, from what I have seen in these and other cases, as well as from the experience of others, that without the decided effects of the mercury, the inflammation would very probably have continued and caused the destruction of the eyes. I therefore conceive that I would not be justified in withholding a remedy which produced such marked beneficial effects when the loss of such an organ is threatened, notwithstanding the high authority which has advocated the non-mercurial treatment. If these advocates were to confine their remarks to the *abuse* of mercury, not the *use* of it, they would obtain many more proselytes.

6. *Artificial Pupil.*—Eleven cases occurred of partial or complete closure of the pupil, or in which the natural pupil was rendered useless from central opacity of the cornea. In four of these, operations for artificial pupil were performed with more or less success in restoring vision. The different modes by which these operations were performed will be detailed in a subsequent report.

7. *Cataract.*—Patients affected with cataract form the most important class of cases at an Eye Infirmary; and these became peculiarly interesting to the surgeon, because this disease is a common cause of blindness which is curable by an operation. Twenty-three cases of cataract presented themselves at the Infirmary. Of these 11 were simple cases; 5 complicated with adhesions between the iris and capsule of the lens; and 7 complicated with amaurosis. Of these cases 12 eyes became the subject of operation, in two of which amaurosis existed. These cases complicated with amaurosis were operated on at the urgent desire of the patients, after the nature of their cases had been explained to them, but without much prospect of benefit. In all the cases, however, the removal of the cataracts and recovery of the eyes were completely successful, so far as the operation was concerned; though in the two cases complicated with amaurosis, very little benefit as to the recovery of sight ensued. In some of the other cases an operation was declined on the part of the patient; in the rest it would have been either improper, or was unnecessary.

In seven of the cases, the opaque lens was removed by the operation of extraction performed in the common way by Beer's knife. In none of the cases was there any of the vitreous humour evacuated, or any entanglement or protrusion of the iris in the incision. In all the cases the pupils were quite circular and of a good size, except in one, where the iris having got under the edge of the knife, a portion of it was cut off by the incision, rather than withdraw the knife to complete the operation otherwise. This case did equally well with the others, the patient having left the Infirmary in 12 days. The pupil was considerably enlarged, but his vision was good.

In one of these cases only was it necessary to bleed the patient after the operation, rest, quiet, and low diet being sufficient to prevent inflammation. The average number of days which these seven patients required to remain in the house after the operations was 13 days.

Five of the cataractous eyes were operated on by the needle, the operations having all been to break up the lens, that it might be removed by absorption. Two of these were the eyes of a young child affected with congenital cataract. One a soft cataract complicated with adhesions to the iris; one of cataract which had been previously partially broken up; and one in which opacity of the lens had supervened to a successful operation for artificial pupil. In the three last cases the eyes got well, and vision was restored. In the case of the infant, nearly the whole of the opaque lenses had become absorbed; and nine weeks after the first operation, which had not been followed by any inflammation, I performed operations, by introducing through the cornea a small straight needle, by which the remaining nucleus was broken up and partially brought into the anterior chamber. Considerable inflammation followed these second operations, and the case is still under treatment.

In the above cases it was peculiarly gratifying to see the beneficial effect of having beds in the house for those requiring operations, their recovery having, in general, been rapid and without inflammatory symptoms, requiring depletion and other remedies; and thus illustrating the practical advantages of the plan upon which the institution is established.

In conclusion, the success of the institution has been very gratifying and satisfactory, and has obtained for it the approbation of those who witnessed the proceedings. To my assistant and house-surgeon, Mr J. P. Rae, I have been under great obligations, as well to the other gentlemen who attended as pupils and assistants. It is also gratifying to me to express the obligation under which I am to Mr Cafe, cupper, for his readiness in having at all times attended to perform local blood-letting in this precise and effectual manner, in patients who required it, by which a great expense for leeches has been saved to the Institution.

Med. & Surg. Jour. Mr INGLEBY'S, CASE. Plate II, p.157 & 149, Vol. XLIII.

Fig. 1.

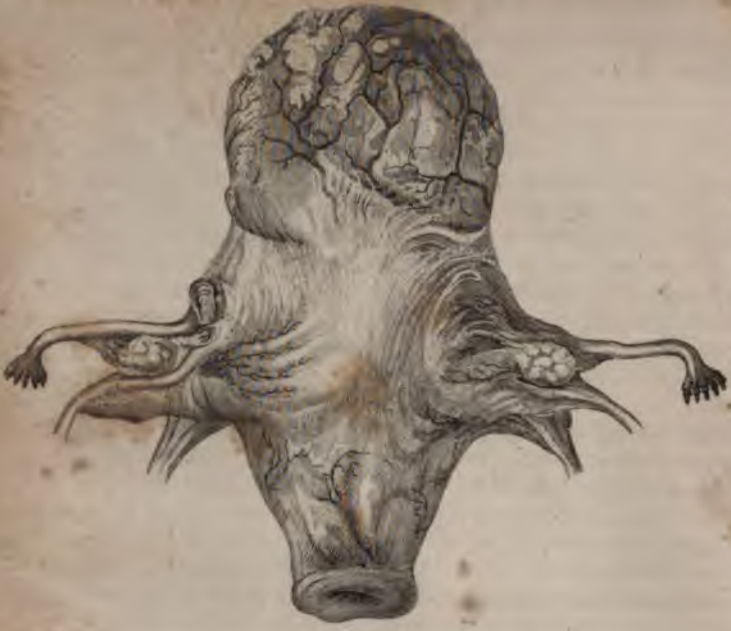
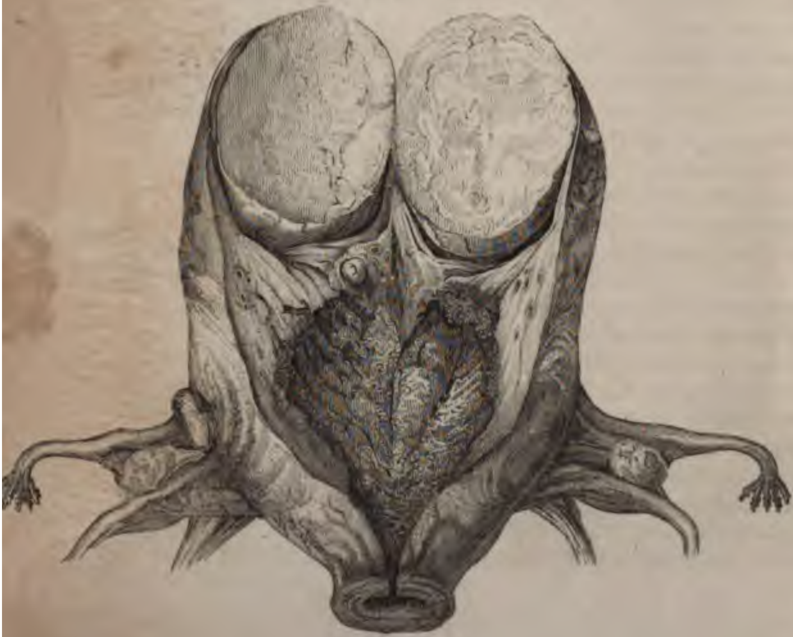


Fig. 2.



Art. IX.—*On Malposition of the Uterus, both in the impregnated and unimpregnated state, in connection with retention of Urine.* By J. T. Ingleby, Esq. Lecturer on Midwifery at the Birmingham School of Medicine.

If the diseases peculiar to females are not essentially more dangerous than diseases affecting the male sex, they require more patient, and, in certain circumstances, more accurate investigation, and in this country are comparatively ill understood. The acknowledged acquirements of the French in the obstetrical department of medicine, seem referable both to their superior opportunities in the investigation of disease, and their unwearied perseverance in scientific research, and in employing the various means of diagnosis.

Malpositions of the *uterus* and bladder constitute some of the most distressing affections to which females are exposed. Descent of the *uterus*, in connection with pregnancy and parturition, is common both to the early and late weeks of gestation, and the first few weeks after delivery; and a material descent rarely occurs under other circumstances, unless occasioned by a polypus or other morbid growth. It is remarked by Mr Roberton, that "the great distension which the *vagina* endures in giving passage to the head of the fœtus for the first time is productive of more temporary injury to that canal, and the neighbouring textures, than happens in a subsequent delivery; and hence ensues a condition of parts favouring the descent of the uterus and bladder." * From this and an accompanying table of cases, this respectable author concludes, that in a great majority of cases uterine descent may be traced to a first labour. Mr Roberton's opinions, being the result of much personal experience, are entitled to great consideration; but whether this particular deduction is founded on a sufficient body of evidence may perhaps admit of doubt. So long as the puerperal *uterus* is in a state of enlargement, and the *vagina* is unduly relaxed, a certain degree of *prolapsus* will almost assuredly ensue, whether in connection with a first or a subsequent delivery. When, however, it is considered that both the *vagina* and *uterus* acquire higher degrees of relaxation in subsequent labours than is common to first labours, and also that the *rugæ* of the *vagina* are less distinguishable after each successive delivery at the full term, the evidence in subversion of the received opinion must be most conclusive. It was represented to me by an eminent lecturer on midwifery, that the *uterus* of a woman recently delivered of a first child contracts more perfectly, and is consequently lighter than under corresponding circumstances in a subsequent delivery; a statement quite incompatible with Mr Roberton's conclusions.

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* Edin. Med. and Surg. Journal for April 1834, p. 395.

As respects the catheter, it scarcely need be remarked, that its employment is sometimes superseded in partial descent of the *uterus* by simply raising the organ with one or two fingers, and, provided a moderate elevation of the pelvis be preserved, probably the obstruction may not recur. When the introduction of the catheter becomes necessary in cases of complete *procidentia uteri*, on account of the peculiar situation of the bladder, its direction should be downward and backward.

Difficult parturition is sometimes followed by inflammatory action, by which the partially prolapsed *uterus* becomes consolidated to the pelvis, and it is obvious that the functions of the bladder may be materially deranged. Retention of urine, consequent upon the descent of the impregnated *uterus*, rarely occurs antecedent to the third month; but when the impregnated *uterus* already contains within its proper tissues a moderately sized fibrous tumour, the bladder may sustain inconvenience very early after conception.

The most important malposition to which the womb is exposed consists in its retroversion; and authors have advanced very discordant opinions respecting the danger which this displacement is calculated to produce. The first few cases which occurred to my notice were simple in their character, and yielded to the regular employment of the catheter. In a still more simple case, but attended with severe pain, to which I was called five or six hours after the malposition (occasioned suddenly by the restraint of company) had taken place, although the pressure upon the *urethra* embarrassed me in the introduction of the catheter, the womb rectified its position almost instantly after the bladder was emptied. But my next cases, so far from being very manageable, proved exceedingly perplexing, both on account of the great developement of the *uterus* and the severity of the symptoms. The catheter was a palliative merely; yet these cases ultimately did well. A case of retroversion, which terminated in death, was reported to me by a surgeon of the highest respectability; but the event was entirely owing to the patient obstinately resisting the introduction of the catheter.

After the very satisfactory evidence adduced by Dr Merriman of the *uterus* continuing in a state of retroversion during the whole course of pregnancy, I need only refer to his dissertation* on the subject, and the statements it contains have in no respect been affected by the severe criticism of Dr Dewees. It has been denied on very recent authority* that a real retroversion can take place *after* the fourth month of gestation; and an opinion is advanced, that the instances reported by Merriman were either examples of extra-uterine gestation or posterior obliquity of the womb. But the case which forms the prominent part of the present communication refutes this opinion, and confirms the facts advanced by Merriman. It is true that in the latter months of gestation a complete retroversion cannot, under any circumstances, take place; but partial displacements have then occurred, and been attended with the most important results, of which a striking example will be found in a subsequent part of this paper.

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* A Dissertation on Retroversion of the Womb.

In the treatment of *retroversio uteri*, the bladder having been relieved, attention should be immediately directed to the state of the *rectum*; the degree of pressure made upon it has been known in some cases to resist the passage even of an injection. Obstructions so very formidable, it is true, rarely arise. A most important, though neglected, part of the treatment, consists in the frequent employment of the catheter; when the retroversion is complete, and the patient has nearly reached the fourth month, the mere evacuation of the bladder at distant intervals may fail to answer our expectations. The introduction of the catheter every fourth hour is preferable to the plan of retaining the instrument within the bladder; we guard against an accumulation of urine, and thus secure the great object in view.†

The amount of urine which will collect in the bladder within this period will be insufficient to maintain the *cervix uteri* in its unnatural situation. Should it be found impracticable to give personal attendance so frequently as the case demands, the introduction of a long elastic gum catheter may perhaps be safely intrusted to a properly instructed nurse; and very marked instances of the advantage of frequently emptying the bladder in cases of retroversion might here be adduced; one shall suffice.

A few weeks ago I was desired by a brother practitioner to visit a woman in consequence of the *uterus* remaining retroverted at the fourth month of pregnancy, notwithstanding the daily introduction of the catheter for many days. The *fundus* had descended almost to the *anus*, and the *os uteri* was just above the brim. At my recommendation the urine was now drawn off four times daily instead of once; and on the third day the organ was restored to the natural position. It cannot be doubted that, in a very large proportion of these cases, the frequent use of the flat silver catheter will be found an all-sufficient remedy. It affords instant relief; and although the *uterus* may possibly regain its natural position immediately after the bladder is emptied, some days will probably elapse before the restoration is complete.

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* Traité Pratique.

† See Dissertation on Retroversion of the Womb, 1810.

Cases, however, which will not yield to the catheter, though few in number, do really occur, and demand the Rectification of the uterus by the hand or fingers only; a mode of treatment very commonly resorted to in Hunter's time, but scarcely ever in the present day. In determining upon rectifying this malposition, we must be influenced not only by the duration and severity of the symptoms, the period of gestation, and the supposed dimension of the pelvis, but also by the actual size of the *uterus*, whether enlarged by pregnancy or disease, or a combination of both. The mere circumstance of the retroversion continuing until the fourth month, although in itself a strong ground for prompt measures, constitutes no absolute necessity for manual interference. The mode in which the *uterus* is lodged in the pelvis must also be taken into account. It may be tightly confined, literally impacted, or it may lie comparatively unrestrained. The *os uteri* may be entirely above the brim, resting upon the *symphysis*, or pressing upon the neck of the bladder, or below the brim, pressing against the *urethra*; and in women who have had many children, perhaps partly above and partly below the brim, pressing both upon the *urethra*, and the cervical part of the bladder. But in the latter case the orifice will soon emerge quite above the brim, on account of the increasing weight and progressive descent of the *fundus*, and the womb will acquire a comparatively oblique inclination.

Without advocating the expediency of this practice as a general rule, I am satisfied that the position of the retroverted *uterus* may be rectified with less difficulty than is usually supposed. A gentleman assured me that he experienced very little difficulty in effecting the change, although his patient had reached the fifth month of her gestation. The risks of this proceeding have been greatly magnified. The only evil to be apprehended from it appears to be the premature expulsion of the *ovum*. Provided, however, the necessary manœuvres are made with caution, such a result is very improbable. From a rude attempt very much may be feared; but when gentleness and skill have failed, violence will not succeed. A little perseverance, however, may be necessary. Having ascertained the nature of the case, and determined upon the propriety of restoring the *uterus*, the bladder being emptied, an attempt to raise the *fundus* above the brim should be made with great care, and in the proper axis, the patient resting on her hands and knees. Bleeding and the hot bath may be premised if the resistance is considerable. By placing two fingers of the left hand in the *rectum* against the *fundus*, and two fingers of the right hand behind the *symphysis pubis* upon the *cervix*, the compound action thus obtained will usually prove successful. The proposal to raise the *fundus*, and, at the same time, to depress the *os uteri*, by means of an instrument passed into the bladder, and used as a lever, [*] will never be contemplated as safe or prudent in this country. If the attempt to rectify the uterus should fail, and no dangerous symptoms appear, the case must be deferred altogether to nature, providing always for the evacuation of the bladder and rectum. Purgatives which occasion straining should be avoided; but since the return of the *fundus uteri* may be rendered difficult by a collection of feculent matter, the regular use of glysters will be highly expedient.

An important question here arises, can the obstacles to the introduction of the catheter, under every variety of retroversion, be always overcome, and will any circumstance, justify an operation having for its immediate object the partial evacuation of the *uterus*? It is said by the late Dr John Clarke, that, "either with a small or flexible catheter, the urine may be drawn off in all cases by a person accustomed to the use of the instrument, and who is acquainted with the nature of the case."[†] Professor Burns observes, "I cannot conceive any case where a gum elastic catheter could not be introduced." It is very certain, however, persons of undoubted skill have sometimes failed in their attempts to reach the bladder. We have already described the different malpositions of the uterine orifice. Two of these may be attended with some embarrassment; 1*st*, when the *os uteri* is below the brim, and pressing heavily on the *urethra*; and, 2*dly*, when it is above the brim, and making great pressure on the inferior part of the bladder. In either case the course of the *urethra* may be more or less distorted. The *uterus* under its complete retroversion may be absolutely impacted within the *pelvis* and immoveable, the orifice being firmly wedged against the upper part of the *urethra*, and resisting the passage of any instrument beyond it. Several fatal instances are on record, in which, owing to this cause, it was found impracticable to enter the bladder. Thus in Mr Walls' case, which terminated in death, the position of the *uterus* could not be changed until the *sym-*

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[*] Traité Pratique, par Med. V. Boivin, et par A. Duges, p. 151–2.

[†] Practical Essays, p. 7.

physis pubis was divided,[*] the same circumstance happened in another instance.[†]

When the retroversion is incomplete, and the *os uteri* lies above the *symphysis pubis*, the pressure will be exerted upon the lower part of the bladder. To this peculiarity in the situation of the uterine orifice, and the trifling amount of urine which has been obtained on passing the catheter, may be ascribed the opinion, that the bladder has been divided into two cavities like the hour-glass; a circumstance which Dr John Clarke has shown to be almost impossible. The deception seems owing to the catheter not having been conveyed beyond that part of the bladder pressed upon by the *os uteri.* The space which intervenes between this portion of the neck of the bladder, and its termination in the *urethra,* must be inconsiderable, and yet, when the bladder is greatly distended, (and it has been proved to contain two gallons,) a sufficient quantity of urine may be contained in it to occasion the deception. This appears to have been the state of the bladder in Dr Cheston's celebrated case, in which the catheter was regularly employed for many days. "I could not, (he remarks) draw off such a quantity of urine as sensibly to diminish the tumour of the abdomen." He therefore tapped the bladder above the *pubis*, and drew off five pints of urine.[‡] In Mr Lynn's case, although the pressure made by the *os uteri* on the neck of the bladder allowed a small quantity of urine to insinuate itself into the catheter from above, it would by no means admit that instrument to pass it from below. The bladder burst from gangrene, and nine or ten pints of urine escaped in the belly.[§] A third very remarkable case, possessing much interest, is detailed elsewhere;[||] and were it not unnecessary, I would add a fourth. The introduction of the catheter may be rendered difficult in consequence of an unusually distorted course of the *urethra.* In the case of retroflection, described in Mr Baynham's paper, and which terminated fatally, the *urethra* was lacerated in the ineffectual attempts to reach the bladder. In another case, in which I was consulted, the angle was so great that it was impracticable to pass a common catheter, male or female. Every attempt was attended by a discharge of blood; and unless we had obtained a catheter with a most extraordinary angle, the bladder must have been punctured. This case will be described in a subsequent communication.

Although the course of the *urethra* will vary a little in different cases of retroversion, I think it is usually drawn more or less upward and backward;—backward in proportion to the descent of the *fundus*; and having selected a catheter with a suitable curve, it is to be passed into the bladder with its concavity towards the *sacrum*; but, should the bladder incline towards the *pubes*, the concavity of the catheter must be towards the *symphysis*. Assuming, then, that serious difficulties in the treatment of retroversion every now and then arise, it may be laid down, that, if the continued pressure should occasion inflammation of the bladder, or render the introduction of a catheter impracticable; or should a formidable obstruction arise to the passage of the feces,* the evacuation of the *liquor amnii* through the *os uteri*; or, if this is not advisable, the puncture of the inferior part of the body of the *uterus* through the *vagina* (not the *rectum*,) and the immediate restoration of the *uterus*, will be essential to the preservation of life. This operation has once been adopted in England, in the dispensary practice of my colleague, Mr Baynham, and I had the gratification of being associated with him in consultation upon it. The situation of his patient, who was six months advanced in pregnancy, was in every respect desperate; and as it was impracticable to pass any instrument through the *os uteri*, as a last resource the *uterus* was punctured *per rectum*, the *liquor amnii* drawn away, and rectification then speadly effected. Recovery most fortunately took place, and a more creditable and instructive case is not on record.† Boyer cites an instance very similar, both in its nature and result.‡ Purcell and Gardien have spoken of symphyseotomy as applicable to these dangerous cases of retroversion; and it has even been suggested to open the abdomen, and then attempt the replacement of the *uterus*.§ Upon the fatality of such measures it is needless to insist.

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[*] Med. Obs. and Inquiries, Vol. i. p. 400.

[†] Perfect's Cases, Vol. i. p. 349.

[‡] Med. Communications, Vol. ii. p. 9.

[§] Med. Obs. and Inquiries, Vol. iv. p. 398.

[||] Glasgow Med. and Surg. Journal Vol. i. No. 3, p. 270.

The retroversion of the womb may be occasioned by diseased structure entirely. Malpositions of this kind, in which the body and *fundus* are enlarged by disease, although noticed by Pearson, Merriman, and others, is but little understood even at this day. In an instance detailed by Dr Merriman, rectification followed the regular employment of the catheter. "This alone," he observes, "will generally perfect the cure;" ‖ a statement unquestionably correct. Nevertheless, the practitioner must not allow the *uterus*, when greatly enlarged by disease, to remain long in a state of retroversion, under an idea that rectification will infallibly take place under the use of the catheter, since the organ will gradually acquire an increase in its bulk, and may ultimately resist every attempt which can be prudently made to alter its position.

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* In Dr Bell's case, which proved fatal, all attempts to pass a glyster were unsuccessful. Inflammation of the intestines, and inflammation and gangrene of the bladder were discovered after death.—See Med. Facts and Obs. Vol. viii. p. 32.

† See this valuable communication in Edin. Med. and Surg. Journal, for April 1830.

‡ Traité des Maladies Chirurgicales, Tom. x. p. 531.

§ Traité Pratique des Maladies de' l'Uterus, par Madame V. Boivin, et par A. Duges, Tome premier, p. 154.

‖ Dissertation, &c. p. 23.

The retroverted *uterus* may also consist partly of the *ovum* and partly of diseased structure, usually of the fibrous or subcartilaginous kind. These growths are more frequently developed in the *fundus* and body, than in the *cervix uteri;* but I have recently prescribed for four females, in each of whom a tumour, varying in size from a large nut to a small hen's egg, has been formed within the tissues of the *cervix*.

The morbid anatomical character of these tumours vary very materially at successive periods of their growth, increasing in consistence from a steatomatous or fibrous deposition to a structure of a cartilaginous and even bony hardness. According to Madame Boivin, their early induration checks their further increase. Between these morbid growths and diseases of a malignant character there is scarcely any analogy, and their progress is seldom denoted by any obvious symptoms.

Although a tumour of this character frequently increases the menstrual secretion, it seldom offers resistance to conception. When the *uterus* generally is affected by it, abortion will probably take place; but a partial enlargement may occasion malposition of the pregnant womb, without interrupting the course of gestation; and many instances of difficult and even fatal parturition have been proved to depend upon this cause. If the tumour be confined to the *fundus uteri*, its presence may not be suspected, and will not impede labour. In this town a woman died apoplectic a week after her delivery; and a large fibrous tumour, the existence of which was not suspected, was found developed in the proper structures of the *fundus* and body of the womb. From the rapid growth which these bodies acquire during pregnancy, and their liability to inflame and implicate the general *peritoneum*, the attendant should observe the state of the circulation both previous to parturition, and also for several days subsequent to the delivery, so as to enable him to detect the first symptoms of mischief, and enjoin an appropriate treatment.

In some instances proper tissues of the *uterus* have acquired an increase in bulk, but in others the walls have become so thin, as to justify an apprehension that the labour-pains might occasion a breach of surface. In all cases of tumours, the chances of inflammation supervening after delivery must greatly increase; and I am not certain whether the frequent and violent contraction of the abdominal muscles upon the tumour in protracted parturition may not favour the attack.

I shall now detail the circumstances of a case of enlargement of the *fundus* by disease, in connection with retroversion of the body of the pregnant womb, which terminated in death after delivery.

CASE.—A lady, who had been married about a year, directed the attention of her confidential physician, Dr Shirley Palmer, to a solid and apparently immoveable tumour, confined at this time to the right iliac region, and, from its pyriform shape, considered by him to be the *uterus.* Menstruation had recurred without interruption from the period of her marriage up to the last two months, about which time the tumour began to attract her notice. In consequence of a sudden inability to void urine, attended with severe pain, I visited her at Dr Palmer's request.

On examination *per vaginam*, I discovered a large tumour in the *pelvis*, in addition to the tumour seated in the right iliac region. By means of a full-sized catheter, a quart of urine was drawn away; but, owing to the course of the *urethra* having become unusually curved, a little manœuvring was necessary in reaching the bladder. The patient having placed herself on her hands and knees, I now made an attempt to elevate the tumour in the *pelvis* above the brim by means of two fingers of the left hand passed into the *rectum*, (the thumb not being sufficiently long,) and two fingers of the right into the *vagina*, but the attempt proved unsuccessful. The bladder being relieved, the chief symptoms were thirst, sickness, frequent vomiting, difficulty in moving, and occasional attacks of pain in the hips and back, but there was neither tenesmus nor expulsive effort. There was subsequently an increased frequency in voiding urine; but this seemed to depend upon an inability to retain more than an ounce or two of urine without inconvenience. The catheter was introduced to prevent the possibility of a mistake.

Examination of the Abdomen.—A firm, immoveable, and inelastic tumour was situate in the hypogastric region, extending nearly from the right *ileum*, to within an inch and a-half of the left, and having a very marked elevation on the right side, and its margin at the *umbilicus* was well defined. The tumour did not impart any particular sensation on pressing it, and neither motion nor pulsation could be detected in it by the hand. The stethoscope merely evinced a whizzing sound near the right groin, differing very sensibly from the sound on the opposite side.

Examination per vaginam.—The tumour in the pelvis had the form and consistence of a fœtal cranium. It lay in the axis of the brim, and was loosely covered with a membrane, through which furrows, resembling the sutures of the fœtal cranium, could be easily distinguished. The apex of the tumour was scarcely two inches from the *os externum.* With some difficulty, the finger could be passed its whole length between the tumour and the *symphysis pubis.* About half-an-inch above the *symphysis*, and barely within reach, I detected the uterine orifice, not quite closed, lying transversely, rather in advance of the tumour. The state of the *cervix* could not be satisfactorily determined. Between the tumour and the posterior part of the *vagina*, I was unable to pass my finger higher than two inches,—its farther passage being prevented by a *cul de sac.*

Examination per rectum.—Almost as high as the finger could reach, the tumour could be felt bulging into the rectum, but not interrupting the passage of the feces.

Subsequent changes.—Although the introduction of the catheter was only once really required, the tumour continued progressively descending, so that, on the eighth day of my attendance, it almost touched the vaginal orifice, having passed as low as the recto-vaginal septum would permit. We now entertained doubts whether the tumour was formed by the impregnated *uterus*, an extra-uterine conception, or a greatly enlarged ovary or womb; and the propriety of returning the part within the abdomen, admitted of serious question. * With a view of satisfying myself as to its impaction in the *pelvis*, having passed two fingers within the vagina, I placed them upon the most depending part of the tumour, (the patient resting on her hands and knees,) and although I made no very considerable effort, the tumour was suddenly carried above the brim. The character of the tumour, within the *abdomen*, was immediately changed. Its situation was central; its margin was just above the *umbilicus*; the *hypogastrium* was greatly distended,—two-thirds of it being occupied by a tumour of a very dense structure, in connection with a softer structure, situated above the *symphysis pubis*, resting on the brim.

The tumours were continuous with each other, and, excepting a marked difference in their form and consistence, there was no line of demarcation. The pains instantly ceased, the *os uteri* regained its natural situation, and the patient felt light and comfortable. The tumour was peculiarly moveable in every part of the *abdomen*, and appeared to have slight irregularities on its surface. For two or three months the tumour continued progressively ascending, and now it was apparent that a very marked change had taken place. The whole of the *abdomen* below the *umbilicus* had become uniformly distended by a substance having all the characters of the gravid womb. This tumefaction extended above the *epigastrium*, and occupied the whole of the right *hypochondrium*. In this tumour very active and even violent movements are not only perceptible to the fingers, and painful to the patient, but visible to the eye; and knuckle-like substances may be traced passing simultaneously with the movements, from one part of the tumour to another. The movements cannot be distinguished when the body is erect, in consequence of the distended state of the abdominal integuments. They were not perceptible before the sixth month, and this will not appear surprising when it is considered that the child was contained in the body and *cervix uteri*, and that a part of the *cervix* was confined within the brim during the whole period of gestation. On examining *per vaginam*, the *os uteri* was felt relaxed and sufficiently open to admit the end of the finger, the *cervix* was quite obliterated, and a substance like a child's head rested on the *symphysis pubis*, in which the movements just described were perceptible on examination *per vaginam*. With the advance of pregnancy the left *hypochondrium* was occupied by a very hard, oblong, tumour, longer than a child's head, and a line of demarcation between this solid tumour and the more generally diffused swelling was tolerably distinct. The dense tumour could now be moved freely from one side nearly to the other, and we felt tolerably assured, that it consisted of a greatly enlarged *uterus*, which had acquired a fibro-cartilaginous structure. * The tumour continued to enlarge, and the *os internum* became very soft and expanded, in consequence of the increasing developement of the *cervix uteri*. In the erect position of the body the *os internum* can barely be reached, being then forced upwards and backwards by the action of the abdominal muscles upon the anterior part of the hard tumour. There appears to have been a material connection between the peculiar displacement in the example before us, and an unusual laxity of the soft parts.

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* Retroversion of the *uterus* may be confounded with tumours, especially with the moderately enlarged ovarium, and with extra-uterine pregnancy. From the latter it may not be easily distinguished, and yet the distinction is of the highest importance. To elevate a tumour, for instance, consisting of the impregnated ovarium, from the recto-vaginal septum, would be converting a comparatively simple, into a very complex case. Dr Young has published a case of extra-uterine pregnancy, in combination with *retroversio uteri*, in Vol. iii. part 2, page 536, of the Edin. Med. Chir. Transactions.

The first approach of labour, on the afternoon of Tuesday 21st October, was denoted by slight pains, and the usual mucosanguineous discharge; but my attendance was not required until about ten o'clock on Wednesday morning, and in two hours she was delivered of a fine living child. The labour was of short duration, and so remarkably easy as to excite the patient's surprise. On the division of the *funis*, I placed my hand upon the *abdomen*, but the relative situation of parts was now quite altered; the hard tumour had promptly descended from the left *hypochondrium* to the hypogastric region, occupying the *abdomen* from *ilium* to *ilium*, and extending from about an inch and a-half above the *umbilicus* to the *ossa pubis.* The *placenta* was expelled within five minutes, and without hemorrhage; but subsequently, the discharge was rather copious. In the evening of this day the patient was seen by Dr Palmer, and her situation was in all respects most satisfactory.

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* The patient embraced the opportunity of consulting my friend, Dr Rigby, during his late visit here to examine the obstetrical class at the school of medicine. The opinion of this practitioner coincided with the opinions previously given on her case.

Thursday, half-past 2 P. M. She remained very comfortable, but the *lochia*, though natural in quantity, was more than usually unpleasant in its odour. The bowels had been gently moved by castor-oil, and milk was secreted. Shortly after my visit, she was seized with considerable pain in the tumour, and Dr Palmer was, in consequence, called to her at 10 P. M. The *abdomen* was extremely tender and swollen, the degree of swelling quite concealing the tumour; she had vomited; the pulse was 130, and feeble; and the countenance most anxious. The treatment recommended comprised fomentations, the abundant application of leeches, with calomel and opium, and mercurial inunction, but she positively declined all treatment.

Friday, noon. The leeches have been applied with great relief. Friday evening. Much the same.

Saturday morning. Effusion has taken place. The exhaustion is so considerable that we were obliged to resort to stimuli. Saturday evening. The puffy state of the abdomen is much diminished, and the tumour may again be distinguished. One side of the abdomen is occupied by it, and the other side by the serous effusion, which distinctly fluctuates.

Sunday. The exhaustion has increased.

Monday morning. She is somewhat improved, but complains of considerable pain in the upper extremities, and the angle of the left jaw is swollen, occasioned, perhaps, by the mercury, although there is no other evidence of its action.

Tuesday morning, 3 o'clock. She expired apparently during sleep.

Autopsy.—The body was examined thirty hours after death. The *peritoneum* lining the abdominal muscles presented a very beautifully injected and radiated appearance. The intestines were distended with air, and their exterior surface assumed a highly injected appearance. The *abdomen* and *pelvis* contained a quart of orange-coloured *serum*, with flakes of lymph, and a quantity of well-formed purulent matter.

The tumour was found to be the *fundus* of the womb. The organ consisted of two parts, a line of demarcation distinguishing the healthy from the diseased structure. The superior part comprised a morbid growth which bulges very considerably both before and behind, and corresponds to the situation of the *fundus*. Its surface is irregular, and appears distended by small depositions. The *peritoneum* covering the tumour presents rather a singular appearance, a deep mottled colour pervading its surface generally with intervening patches of the colour of lymph. The inferior part of the tumour corresponds with the body and neck of the organ, and is healthy. Blood-vessels traverse its surface in a radiated form, but its colour is otherwise quite natural.

The *uterus* and appendages, when divested of all the loose cellular tissue, weighed three pounds and six ounces. The length taken by compasses is 11¼ inches; the breadth 4¾ inches; the circumference of the diseased growth is 14 inches; the distance from the centre of the *fundus* to the Fallopian tubes, is 5¾ inches, and the distance from the Fallopian tube to the *os uteri* from 5¾ to 6 inches. The depth of the cut surface is 3½ inches.

On opening the *uterus*, and making a section of the tumour, it was found to consist of a fibrous-like structure, improperly termed the fleshy tubercle, but more appropriately designated by Hooper, the subcartilaginous tumour.* (Plate II.) On minute examination, the tumour appeared to be composed of two structures, the one rather brown and like cow's udder, the other white, and resembling gristle. The brown structure greatly predominates over the white, and the gristly structure, though partially diffused through the whole tumour, is deposited chiefly on its exterior surface, and thus imparted to the fingers during life a firmness of structure which the interior of the tumour did not possess. In form, the tumour is globular, and occupies the whole region of the *fundus uteri*, where it appears to have been developed in every direction, but peculiarly so towards its summit, three-fourths of the tumour from above downwards having nothing besides *peritoneum* for its envelope; the remaining fourth is covered both by the *peritoneum*, and the proper tissue of the womb, greatly attenuated. The capsule, therefore, which contains the tumour, is chiefly formed by the *peritoneum*, but partly both by the *peritoneum*, and the attenuated uterine substance. At the posterior surface, the tumour adheres very closely to the capsule, though not by any apparent vessels; but the great mass of the tumour is perfectly loose, having no communication whatever with the parts around it. (Plate II. Fig. 1. and 2.)

The disease seems to have commenced about the centre of the *fundus uteri*, and within its fibrous tissue, the absorption of which must have been progressive. In the body of the *uterus*, the proper fibrous tissue remains almost natural, and a small tumour, rather larger than a full-sized horse-bean, was imbedded in it. It was quite loose, and dropped out of the cavity containing it, which resembles a defined but well-formed cyst.

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* See Hooper's Morbid Anatomy of the Human Uterus, p. 10, and Plates 4, 5, and 6, of which figure 2 in Plate 4, although not so fine a specimen, is the nearest representation of the annexed engraving, displaying the *uterus* and tumour laid open.

The *cervix* is scarcely if at all thinner than usual; a circumstance which appears rather singular, when it is considered that its structures were fully unfolded as early as the fifth month, and that it contained a part of the child during two-thirds of the period of pregnancy. The *placenta* was attached as high as the tumour would admit, and the vessels corresponding with its implantation appear very large.

It is clear from the history of the case, that the retroversion preceded for several weeks the retention of urine, and was not primarily occasioned by it. The case is instructive, especially in the fact of the retroversion continuing (for there is no evidence when it took place) for so long a period. Instead of the *uterus* returning to its natural position on the bladder being emptied, it continued progressively descending, and, if rectification had been neglected, the retroversion must have remained until, by increasing its bulk, the elevation of the gravid womb would have been wholly impracticable. The retroversion of the body of *uterus*, when the far greater part of the organ was within the *abdomen*, is certainly very singular. Judging from what happened in this case, it is evident that the *fundus* may remain within the *abdomen*, and the neck rest upon the *symphysis pubis*, whilst the body of the organ is near the outlet.

Before delivery the tumour was not productive of pain or tenderness; the inconvenience was merely mechanical. She was harassed by occasional attacks of vomiting and heartburn; but these depended upon her habits of life, and not upon the state of the *uterus*. I need only observe, that her habits, which were most uncongenial either to health or happiness, were persevered in up to the hour of labour, notwithstanding the strongest remonstrance; under these circumstances, an attack of acute *peritonitis* would almost certainly prove fatal, and, to render the chances of recovery as slight as possible, twelve hours elapsed after the treatment had been determined upon, before our unhappy patient could be prevailed upon to commence it.

The patient had suffered severely for many years from attacks of *hysteria*, bordering at times on *nymphomania*; the *hysteria* alternated with *haematemesis*; and occasionally she suffered from attacks of *dysuria*. It appears highly probable that these were connected with the disease of the *uterus* in an incipient state, and that the marriage and consequent impregnation had given an impulse to a disease before dormant.

It has already been stated that a tumour, when confined to the structures of the *fundus uteri*, will not interfere with the process of labour. But when a large tumour is attached to the *cervix*, malposition of this part of the womb will almost certainly ensue, and, by obstructing labour, prove a source of great danger.

The details of a case of this nature were very obligingly furnished me by a medical friend. It appears that the patient had experienced labour-pains for five days, during which time a large tumour occupied the whole of the brim of the *pelvis*, descending also into the hollow of the *sacrum*, and the uterine orifice, being forced quite above the *symphysis pubis*, could not be distinguished. On the fifth day the tumour receded, and the *os uteri* now descended through the brim, but the labour-pains being inefficient for expulsion, and the child being dead, delivery was effected by the operation of craniotomy. I need not say that every possible assistance was afforded the patient, when it is known that she was attended by two of the most able practitioners which the profession affords. But, notwithstanding their judicious treatment during labour, and their prompt measures subsequent to labour, the patient died from inflammation on the tenth day.

On the examination of the body, a very large mass was seen at the lower part of the *abdomen*, and occupying the brim of the *pelvis*. It appeared to be divided into two parts by a deep indentation; one part, which proved to be the *uterus*, was situated above the brim, the other part, formed by the tumour, quite occupied the brim, and presented through it. It was situate within, and apparently formed part of, the *parietes* of the posterior part of the *cervix uteri*. Its diameter measured 3½ inches; externally it felt very hard, but internally it was pulpy, and contained some liquid. Three other tumours, divided by thin membranous septa, were also found developed in the proper tissue of the *uterus*. The intestines were in close adhesion to the liver, *uterus*, and the large tumour, and also to each other; coagulable and flocculent lymph and serum had been extensively effused.

The flexions of the *uterus* are numerous, and may affect almost any part of the organ. According to Baudelocque, "in certain obliquities of the *uterus*, the *cervix* has been flexed on the same side as the *fundus*," "recurved like a horn," and Boër maintains, "that, five times out of twelve, the *cervix uteri* during pregnancy bends to the same side as the *fundus*." Madame Boivin asserts that flexion takes place, "more particularly near the place where the *cervix* is fixed upon the body of the *uterus*;" and that in retroflexion the *cervix* is sometimes "forcibly directed backward," "the *fundus* being also carried a little backward." We learn from Denman, that in retroflexion the *fundus* is turned downwards and backwards in the *recto-vaginal septum*, the *os uteri* remaining in its natural position; and he further observes, that this alteration is produced by the bending of the *uterus* in the middle, and only immediately after delivery; a conclusion which subsequent observation has disproved.

"It has been asserted," observes Dr Blundell, that, "if the *uterus* is not retroverted, the *os uteri* will always be found lying forward and upward above the brim in front; but this is a mistake. The occurrence is sufficiently frequent to render the diagnosis worth your attention. Remember, however, that it is far from being the sole or principal one by which you are to judge,—*first*, because when the neck of the *uterus* is very flexible, as sometimes you may have a retroversion of the body only, the *uterus* doubling backwards upon its own *cervix*, and the *os uteri* remaining nearly in its former situation." The direction of the *os uteri* is usually regulated by the degree in which the *fundus* is displaced, but not invariably so. Instead of being in its natural situation, the *os uteri* may be projected above the *symphysis pubis*, as in the case detailed, whilst the *fundus* is in the *abdomen*, and the body and neck of the *uterus* remain in the true *pelvis*, and constitute the retroversion. This change is more likely to happen at the time when the bulk of the *uterus* is quitting or has just quitted the true *pelvis*; for under these circumstances the *os uteri* might easily emerge, and rest above the brim.

In Mr Baynham's communication, already referred to, a case is described of retroflexion, or incomplete retroversion, of the pregnant *uterus*. It appears that a woman, not supposed to be pregnant, had suffered severely from retention of urine, in connection with a distended state of the abdomen, and a distinct tumour situated on the right side between the *pubis* and *umbilicus*. Death occurred on the 13th day from a laceration (by the catheter) of the *urethra*, where it formed an angle, and the continued retention of urine.

On inspection, a part of the *uterus*, embracing the head and chest, of an apparently five months child, was found tightly retained in the *pelvis*, and a considerable part of the *uterus*, containing the other parts of the child, was still above the brim.

The term *antiversion* signifies that displacement of the womb, in which its *fundus* lies forward upon the bladder, or between the *vagina* and bladder, the *os uteri* being directed to the *sa-*

crum. Professor Burns informs us, that he never met with an instance of it during gestation. It seems doubtful whether antiversion in the unimpregnated *uterus* will be attended with retention of urine. According to Boivin and Duges, the pressure of the *fundus uteri* keeps the bladder empty. According to Desgranges, the *fundus uteri* sometimes descends still lower, pressing upon the neck of the bladder, and favouring retention of urine. In this case, the *os uteri* will exert more or less pressure upon the *rectum.*

A middle-aged unmarried woman, supposed to be the subject of diseased bladder, was recently sent to me from the country, in whom antiversion existed in its perfect form. The demands upon the bladder were nearly incessant. Its structures were apparently sound, and it did not contain urine. The bowels were obstinate. I could easily alter the position of the *uterus;* but on withdrawing my fingers, it immediately relapsed into its natural position. At present she has not obtained relief.

The common form of obliquity of the gravid *uterus* is that in which the organ inclines more or less to either side; and although sometimes occasioned by a deformity of the spine, or brim of the pelvis, or both, more frequently depends either upon an accumulation of feces in the large intestines, or an undue relaxation of the abdominal *parietes*, possibly in connection with fecal accumulation. The inconvenience which arises during labour is usually slight, and easily overcome. Obliquity may also be occasioned by any extraneous growth which interferes with the natural inclination of the organ. In a very interesting example of this kind, a tumour, which was very tender to the touch, and about the size of a large orange, partly occupied the brim of the pelvis, and partly the left iliac region, during the act of parturition. Gradually the uterus fell into the axis of the brim, and delivery terminated very favourably. Two years have elapsed, and the tumour has scarcely undergone any change, but it is now variable in its position.

Uterine obliquity is rarely observed prior to the accession of labour; but in women who have borne many children, a high degree of obliquity may occur soon after the third month, and by its obscurity constitute a source of great danger.

I subjoin an example. A woman with a large *pelvis,* and a very lax state of the abdominal coverings, noticed a tumour about the size of an infant *cranium* resting almost upon the *ilium.* It proved to be the gravid *uterus,* for, after a succession of hemorrhages, expulsive pains came on, by which the *uterus* was brought into the centre of the *hypogastrium,* terminating in the delivery of a five months child and *placenta.* The patient was greatly exhausted, and died almost immediately.

Art. X.—*Cases illustrative of the Pathology of the Heart.*

By William Henderson, M. D.

Case I.—***Rupture of the Semilunar Valves.***—James Lamb, aged 44, a labourer, of intemperate habits, was visited by me on the 6th of September last. I found him labouring under great dyspnœa, which he stated to be so unremitting and severe, that he could seldom lie in bed, and usually slept in a chair. His countenance was exsanguine, and expressive of anxiety; his lips livid. He complained of frequent cough, which was usually accompanied by moderate expectoration of yellow and viscid mucus. He had severe and constant pain in the region of the heart along the left cartilages; pulse 110, regular, soft, and moderately full; bowels costive; profuse night sweats; some œdema of the legs and face; urine scanty.

The impulse of the heart was very strong both in its usual place, and to some extent round this. A well-marked bellows sound accompanied the shock, and the second sound had somewhat of the bellows character, but was obscure and imperfect, and seemed to terminate the prolonged first sound.

About four months ago, while making a very great exertion to assist a loaded cart up a rather steep ascent, he was suddenly seized with excessive difficulty of breathing and faintness. He was carried home, and has since continued subject to difficult respiration, which possessed nearly the severe character noted above for more than six weeks before my visit. The great increase which his sufferings had undergone during that period, he attributed to exposure to cold and moisture in the course of his employment.

Fourteen leeches were ordered to be applied over the site of the heart, and three powders prescribed, each containing five grains of calomel, and half a grain of opium.

During the two following days he experienced much relief in breathing; and on the 8th September the action of the heart was not stronger than natural.

Circumstances prevented my making a very careful examination of the chest before the 10th, when the following report is given. In the region of the ventricles, from the fourth to the sixth rib, the heart's impulse is trifling and diffused. There is a bellows sound during the ventricular contraction, followed by a very obscure *souffle* in place of the second sound.

At the fourth cartilage, on the left side, there is a much stronger bellows sound during the impulse of the heart than exists below that situation; the second sound is barely audible. As the stethoscope is applied higher, the two sounds become progressively louder; and near the top of the sternum, especially at its right side, about the second cartilage, the two sounds seem close to the ear, loud, and slightly rough. From this position laterally, the sounds become gradually less distinct, until they cease towards the *axillæ*. Above the clavicles, one sound is heard pretty distinctly, but it cannot be said to possess the bellows character. As low as the fourth cartilage on the right, the two sounds are loud, and of the same nature as at the corresponding situation on the left of the sternum; but from the fourth to the seventh cartillage there is much less bellows sound during the ventricular contraction, and the second sound is almost pure, and of a loud tone. At the upper third of the sternum is an impulse having much of the diffused character of that in the region of the heart, but sometimes more distinct, especially when felt through the medium of the stethoscope. A distinct thrill may occasionally be detected superiorly, most decided at the space between the second and third right cartilages.

Percussion made on the sternum elicits a sound considerably less clear along its whole extent, than on the upper parts of the chest elsewhere. Similar dulness of percussion extends between the fourth and sixth ribs on the left, to the distance of two inches laterally, beyond the line of the *mammilla*.

Percussion is dull inferiorly on the back of the chest, on which aspect subcrepitous and sharp mucous rattles are audible.

Stethoscopic examination yielded similar results until the period of his death, which took place on the 29th September. The impulse of the heart never became stronger, and commonly assumed a double character,—one shock attending each sound, the second beat being sometimes more distinct than the first. The sounds were usually faint in the region of the heart.

The treatment consisted in two bleedings from the arm, anodynes, and diuretics.

Dissection.—The right side of the chest is occupied by about five pounds of sero-sanguinolent fluid. The anterior and upper part of right lung laps over the course of the ascending aorta, is perfectly dense, and devoid of crepitation when squeezed. This condensation extends behind nearly the whole length of the sternum, and is about three fingers' breadth. The colour of the divided surface is partly brown, and partly that of venous clot. Other parts of the lung present similar apoplectic spots. The lower half of the same lung is infiltrated with dark-coloured serous fluid. The left lung has a small patch of tubercles at the apex, and several small apoplectic masses elsewhere.

The pericardium contains about six ounces of fluid, having the appearance of bloody serum.

The heart is nearly double its natural size,—all its cavities dilated, especially the left ventricle, which is remarkably large and round, with hypertrophied walls. The auriculo-ventricular openings are so large as to admit four fingers. The pulmonary artery is sound. The thoracic aorta is nowhere dilated, and its internal membrane is perfectly smooth and healthy; the valves of this vessel are, however, remarkably diseased. Two of them, near their point of union, appear to have been torn, so that one is separated from its attachment for about a third of its extent, and the other is cleft for nearly four lines, at a little distance from its connection to the vessel. The two lacerations are united into one ragged gap, by a raised portion of the lining membrane of the vessel passing from the base of one to that of the other.

The two valves are, besides, covered with prolonged fibrinous vegetations; one, in particular, is about the size of a pea, filled with gritty particles, and attached to the margin of one of the valves by a pedicle three lines long. The remaining valve is entire, and studded with fibrinous and earthy patches.

There is, I think, no room for doubt that the conditions of disease described above originated in rupture of the valves of the aorta. From the history of the patient, it appears that he was first suddenly affected with symptoms referable to the chest while undergoing a very laborious exertion,—a circumstance by which the organs of circulation are rendered peculiarly subject to injury. It is also worthy of remark, that no part of the lining membrane of the heart or of the aorta presented any trace of inflammatory disease; the whole was confined to the valves, as if the affection were of a purely local nature, and dependent on a lesion peculiar to them.

The physical signs which occurred during life afford several points of interest. In one of the most elaborate works on the morbid phenomena of the heart and great vessels, it is observed, that, " when a bellows-murmur is louder along the tract of the ascending aorta than opposite to the valves, and is at the same time peculiarly superficial and hissing, it proceeds from disease of that vessel;" and that, when a murmur accompanies the second sound—in disease of the semilunar valves—from regurgitation through the aortic opening, " its source may be known by its being louder and more superficial opposite to those valves than elsewhere." (Hope). Influenced by views such as these,—which tended to obviate the opinion, that the sounds in this instance proceeded from diseased aortic valves,—and by the impaired sound yielded by percussion on the superior half of the sternum, I was led to suspect the existence of aneurismal disease in the course of the ascending aorta,—an opinion in which I was joined by Drs Scott, Taylor, and Spittal, who visited the patient along with me. An additional reason for this conclusion I derived from the phenomena presented by a case of substernal aneurism, which I had an opportunity of examining through the kindness of Mr Fergusson.

In this case there were, indeed, two external pulsating projections, but the signs presented in the regions of the heart and ascending aorta were remarkably similar in the two cases. Two rather rough bellows-sounds, of equal intensity, occurred in both along the course of the aorta, and these, especially the second, underwent very great diminution, as the examination was extended more to the region of the heart,—another fact at variance with the statements of Dr Hope, who, in treating of the sounds of substernal aneurism, observes, that, when the second sound is heard in this disease, it sustains " a progressive augmentation on advancing towards the heart." The peculiarity of the sounds observed in Mr Fergusson's case seem to have depended on the form of the aneurism, which was sacculated. The sac was large, possessed very elastic walls, contained no coagula, and communicated with the aorta by a comparatively narrow opening, at which the two sounds must have been produced by the influx and efflux of the blood, for the valves of the vessel were thickened but slightly, and were perfectly adapted to their office.

It is obvious, that, in the case of Lamb, the condensed margin of the right lung, which was pushed, by the effusion into the cavity of the pleura, more to the left than usual, so as to overlap the ascending aorta, communicated the impulse of the vessel to the adjacent part of the sternum, and likewise transmitted the sonorous vibrations produced in its fluid and its walls, by the fibrinous prolongations which were attached to the semilunar valves.

Case II.—*Pericarditis, and large excrescences on the Aortic Valves, &c.*—It is now the prevalent opinion, that the spongy vegetations, or excrescences, found on the lining membrane and valves of the heart, result from inflammatory action. Some writers support this opinion on the analogy presented by many of those productions to the nodules of lymph deposited on the serous surfaces of the different cavities of the body by the agency of inflammation ; others adopt the same view of their nature from the frequency with which they co-exist with pericarditis; but I am not aware of any author who has adduced an instance of these morbid formations attached to a surface which had exhibited unquestionable traces of the inflammatory process. I am induced, therefore, to give the subjoined case, because I conceive it to afford an excellent example of the inflammatory origin of those bodies. I may observe, that the case was not entirely under my care.

J. Wilson, a female, 24 years old, applied for medical attendance on the 11th of June 1830, with the following symptoms. Pain and sense of weight in the head ; rather hot and dry skin; restlessness and want of sleep; whitish and moist tongue; remarkably full pulse, beating at the rate of 100, and resisting pressure considerably; some nausea; *catamenia* suppressed for several months; and a tumour, emerging from the pelvis, felt distinctly higher than the *pubis.* The expression of her countenance was natural.

She stated, that, a fortnight previously, she had been affected with headach, nausea, and rigors,—complaints which had succeeded exposure to cold. Before that period her health had been good.

The treatment from the 11th to the 20th of June consisted in blood-letting from the arm, to the extent of twelve ounces, purgative draught, which operated, and a solution of the citrate of ammonia in frequent doses daily.

On the 20th, when the headach was relieved, she was reported to have continued in much the same state as now described; but was affected with pain at the upper and right part of the chest anteriorly, some cough, and copious salivation, for which no cause could be assigned. She lay at this time chiefly on the right side, or back.

As I was then not accustomed to the practice of auscultation, I requested the late Dr J. C. Gregory, whose ability as a stethoscopist is well known, to examine the chest. He obligingly did so, and stated that no appreciable sign of disease could be detected. She was now bled to fourteen ounces, with the effect of diminishing the extraordinary fulness of the pulse. The blood did not prove sizy.

On the 22d, she had neither pain, nor cough, and her pulse was 100 and full.

23d. No pain or cough; had a good night's rest; skin moderately warm, and moist; pulse rather more than 100, full, and irregular; anorexia; salivation continues.

Under the use of a weak solution of tartar emetic till the 26th, her pulse became less frequent and softer. She had slept little.

On the evening of the 26th the pulse had become more frequent and less strong. On the 27th it was 120, small, and weak; extremities rather cold; breathing frequent, with catching pain at the inferior part of the right side of the chest; tongue moist; bowels once moved since yesterday.

In the course of the day she passed a fœtus in the fifth month, and died on the morning of the 28th.

Inspection.—The pericardium was greatly distended, so as to occupy the whole space behind the sternum, and to extend considerably to either side. It contained a pound and a half of serous-like fluid tinged slightly with blood. The whole inner surface of the membrane was roughened with effused lymph, apparently recent. The substance of the heart was rather flabby. In the left ventricle were several clots of blood entangled near the aortic opening, with some large excrescences, irregular and spongy in appearance, and of a soft consistence. The coagula did not adhere to the latter, and were easily disentangled. The excrescences covered nearly the whole surface of two of the semilunar valves, and were likewise attached to the contiguous part of the heart. When the aorta and left ventricle were cut open, and the divided parts separated, the vegetations were found to measure along the direction of the valves an inch and a half, and to form four divisions, the largest of which projected from its base eight lines. The substance of the heart where these bodies were attached was much softened, and its membrane of a dark-red colour. This softening extended quite through the wall to the margin of the auricular opening on the right side, at which place there was a small soft, purple spot, from which a vegetation projected. Several small ragged slits existed in those aortic valves, on which the excrescences grew; and a few fibrinous nodules projected from the side of the vessel opposite to them, immediately anterior to which the artery had the appearance of increased vascularity.

The excrescences adhered firmly to the valves and side of the ventricle, and round their bases were numerous soft granules, and shreds of lymph, easily removed from the subjacent membrane.

When the parts were placed in the position they occupied before the vessel was slit up, the channel left at the place where the vegetations existed was barely four lines in diameter.

The last fact in the account of the morbid appearances precludes the supposition, that the excrescences had attained nearly the size they presented on dissection so early as the 23d, or five days before death; for on that day the pulse is stated to have been full,—a condition which it never could have presented had the obstruction at the aortic opening been great. It is not to be supposed that the very large vegetations described above were altogether the productions of the inflamed surface. A much more probable conjecture is, that the greater part of the excrescences was formed by the deposition of fibrinous particles from the blood passing out of the heart, adhering to the rough nodules of lymph thrown out by the inflamed membrane. The constituent parts of the blood show a remarkable tendency, as every one knows, to separate, while inflammatory action is going on,—a circumstance that might have contributed to the above formations in the present instance. It is also a well-known fact, that, by simply churning a quantity of newly-drawn blood, the fibrin accumulates on, and adheres to, the instrument used, in a form remarkably similar to the excrescences in question.

PART II.

CRITICAL ANALYSIS.

Art. I.—*Ragionamenti, Sperienze ed Osservazioni Patologiche comprovanti l'Antagonismo Nervoso, esposti e raccolte da Carlo Francisco Bellingeri Medico Della Real Corte Pel Solo Titolo, Preside della Facolta Medica Nella R. Universita, &c.* Torino, 1833, 8vo, pp. 397.

We now come to the consideration of the contents of the most recent treatise of M. Bellingeri, or that in which he undertakes to demonstrate, by reasonings, experiments, and proofs derived from pathological anatomy, the truth of that method of explaining certain phenomena of the Nervous System, to which he applies the general denomination of *Nervous Antagonism.* We have in our last article given sufficiently full explanations of what was generally meant by the term *Antagonism*, and of the sense in which Bellingeri employs the terms *Nervous Antagonism;* and we also gave a view of the progress which the author had made in expounding this doctrine, in adducing the proofs in its favour, and illustrating its applications, to the year 1826.

This view, as a preliminary statement, was requisite, in order to enable our readers to comprehend the subsequent and more extended train of investigation into which the author was led, and in which he makes frequent or occasional reference to doctrines which he had promulgated, or proofs which he had adduced in his previous dissertations. In the performance of this duty, we conceived it proper to restrict ourselves to a simple account of the doctrines maintained by M. Bellingeri, and the facts and arguments, experimental or pathological, by which he studies to establish their truth,—without expressing any opinion as to the truth of these doctrines, the accuracy of the facts, or the validity of the arguments. In the account which is now to follow of the contents of the present treatise, we propose to observe the same unbiassed and impartial course; and, whatever opinion we may finally be led to entertain upon the validity of the doctrines of Bellingeri, we shall keep that entirely apart from those statements which we conceive requisite to make, in order to communicate a correct idea of the physiological doctrines maintained by this author.

Though Bellingeri maintains that he had proved experimentally, that the anterior strands of the spinal chord and the anterior roots of the spinal nerves preside over the motions of flexion in the abdominal extremities, and that the posterior strands of the spinal chord and the posterior roots of the spinal nerves regulate the motions of extension in these extremities,—he allows that the majority of physiologists adhere to the opinion of Magendie, who inferred from his experiments, that only the anterior roots preside over motion, and that the posterior roots are void of this influence, and merely minister to the sense of tact. He further allows that Sir Charles Bell had, before Magendie, published an analogous opinion, viz. that the posterior roots are only destined to the sense of touch, and the anterior to the faculty of motion; and he allows that many authors, among others Velpeau, Ahlberg, and Retzius, have studied to prove the truth of the opinion of Magendie, by facts derived from pathological observations.

It is chiefly with the view of proving the accuracy of his own doctrines, in opposition to those maintained by the physiologists now mentioned, that Bellingeri resumes the investigation in its present extended scale, with the following objects; 1*st*, to demonstrate the proposition, that the *cerebellum*, the posterior or cerebellic strands of the spinal chord, and the posterior roots of the spinal nerves, are destined to produce motion; 2*dly*, to discover what species of motions are under the influence of these parts; and 3*dly*, to demonstrate the truth of the theory of the nervous antagonism which subsists between the said portions of the encephalo-spinal system and the brain proper or its productions, viz. the pyramidal bodies, the anterior strands of the spinal chord, and the filaments of the anterior roots which issue from these strands.

To perform this task in a methodical and systematic manner, Bellingeri proceeds to establish and demonstrate a series of propositions, all bearing on the general question at issue; and we believe that the best mode of communicating a reasonably just idea of his train of argument and its conclusiveness is to follow the author in the examination of these propositions.

I. The first proposition laid down by Bellingeri is, that *the cerebellum, the posterior strands of the spinal chord, and the posterior roots of the spinal nerves, preside over motions*; and, with the view of demonstrating the truth of this doctrine, he adduces the following facts and considerations. Nerves unequivocally devoted to organs of motion, for instance, the fourth pair, and the smaller portion of the fifth, issue from the *cerebellum.*

The seventh pair, the origin of which has not yet been clearly determined, he does not refer to this head, though it appears to issue from the prolongations of the *cerebellum.* The experiments of various physiologists are to the same effect. Thus, Saucerotte showed that sections of the *cerebellum* produce palsy of the opposite side, and cause the animal to incline to that side on which the injury is inflicted, and that these lesions give rise to universal convulsions. The same fact was also demonstrated by the direct experiments of Rolando, who thence was induced to regard the *cerebellum* as the organ destined to produce movements; and by those of Flourens, who concluded the *cerebellum* to be the regulator of motion. These experiments were repeated by Schoepf with analogous results. It is further ascertained by the same experiments, and by those first performed by Flourens and Serres, that injuries inflicted on one side of the *cerebellum* produce palsy in the muscles of the opposite side.

Though we have few pathological observations on the influence of the *cerebellum* on the voluntary motions, M. Bellingeri thinks there are enough to show that the morbid states of this organ produce sometimes spasms and sometimes palsy. In proof of the first division of this proposition, M. Bellingeri adduces several examples of this kind, which show that morbid states of the *cerebellum* alone are quite adequate to induce remarkable derangement and irregularity of the muscular movements. Serres, for instance, records a case in which redness of the countenance, strong pulse, slow and irregular respiration, apoplexy, convulsive accessions, tetanic rigidity of the muscles, priapism, and death, were found to be associated with intense inflammation of the whole *cerebellum*, without affection of the brain. Mance found general spasmodic motions like convulsions, *trismus*, rigid tension of the extremities, resisting flexion, priapism, and death, associated with universal inflammation of the *cerebellum.* And Wenzel saw reason to refer the convulsive motions of epilepsy to some affection of the *cerebellum.*

To show that disorder of the *cerebellum* produces, under certain circumstances, paralytic affections, M. Bellingeri refers to such cases as the following. Delamare records the case of a man who, for a whole year, was subject to giddiness and vomiting, without fever, who tottered on the legs, and was often ready to tumble forwards; and, upon inspection, though the membranes and both lobes of the brain were sound, the envelope of the *cerebellum* was collapsed and rugous, and contained about the bulk of an egg-shell of brown, fetid, lymphatico-purulent fluid. In an analogous case recorded by Ahlberg and Retzius, headach, aggravated by motion, liability to stumble in walking, unexpected and frequent falls, imperfect palsy of the right side of the face and all the lower part of the person, involuntary discharge of urine and feces, apoplexy, and death, were found to be connected with a tumour as large as a nut, which compressed the moriform body, (*corpus rhomboideum, corpus dentatum,*) of the *cerebellum.* In another case given by Rougier, loss of recollection, *aphonia,* palsy of the right side, and retraction of the mouth to the left, was found to be connected with pulpy softening of the white matter of the *cerebellum.* In a fourth case, in which somnolence, loss of recollection, agitation, priapism, short respiration, *hemiplegia* of the left side, especially the leg, and spasmodic agitations, preceded the fatal event,—the sinuses of the *dura mater* were full of black clots, the vessels of the *pia mater* were distended, the substance of the brain sound,—but the *cerebellum* presented universal inflammation, and blood issuing from the centre of the right hemisphere of the *cerebellum* was effused into the fourth ventricle. In a case communicated by Dubois to Serres, apoplexy, insensibility of the skin, difficult deglutition, complete relaxation of the extremities of the right side, inextensible flexion of the extremities, spasmodic contractions of the muscles of the face on that side, *opisthotonos* of the head, priapism, and involuntary dejections, ending in death, were found connected with effusion in the left *corpus striatum,* softening of the neighbouring parts, and general injection of the brain, numerous small effusions in the *cerebellum,* and especially in the superior vermiform process, and remarkable effusion behind the right hemisphere of the *cerebellum.* On this case M. Bellingeri observes, that the *hemiplegia* of the right side ought rather to be ascribed to the bloody effusion and softening met in the *corpus striatum* and left hemisphere of the brain, than to the bloody effusion found behind the right hemisphere of the *cerebellum,* otherwise the palsy ought to have taken place on the same side as the lesion, and not on the opposite side,—whereas, the inextensible flexion of the extremities and the spasms of the face took place on the left side.

To show again the influence of the *cerebellum* over the motions, and demonstrate the fact of the occurrence of palsy on the side opposite to the lesion, he quotes from Serres a case in which palsy of the *right* side, and *immoveable rigidity* of the leg, arose from extravasation and bloody effusion into the *left* hemisphere of the brain;—and a case of Brunet, in which palsy of the muscles of the *left* side of the face, and complete palsy of the *left arm,* arose from bloody effusion into the *cerebellum,* proceeding from disorganization of the base of the right hemisphere; and from the whole of these he deduces the general conclusion, that, when there is only inflammation of the *cerebellum,* or any of its results calculated to induce irritation merely, then spasms are the result; and when there is bloody or serous effusion capable of producing intense pressure, or when the part is disorganized or destroyed, then palsy is the consequence.

From the proposition thus established, that the *cerebellum* regulates motions, M. Bellingeri thinks it obviously follows, that the posterior or cerebellic strands of the spinal chord, which are solely and evidently productions of the *cerebellum*, must, in like manner, contribute to motions. This inference, however, which is an anatomico-physiological one, he admits, appears to be at variance with the experiments of Magendie, who has studied to show that the posterior strands of the chord, or at least the posterior nerves, are devoted not to motion, but merely to sensation. To these, again, he opposes not only the experiments of Fodera and himself, detailed in our last number, but those of Rolando and Schoepf,—the former of whom showed that division of the posterior strands or superior chords in animals induces palsy of the muscles which receive nerves issuing from the spinal chord below the point of section; while the experiments of the latter show that the posterior or *cerebellic* strands of the spinal chord are subservient to motions. (P. 40.)

As pathological evidence in confirmation of the same proposition, he adduces two cases; one from Rolando, in which, in consequence of fracture of the posterior annular rings or spinal plates of the fifth and sixth cervical *vertebræ*, palsy of all the parts below the injury, with loss of sensation, ensued, and was connected with dark-coloured softening of the posterior strands; and one from Bayle, in which a cancerous tumour formed between the plates of the arachnoid, corresponding to the tenth dorsal *vertebræ*, with conversion of the spinal chord into soft pulp, gave rise to frequent acute pains in the lower extremities, and eventually total loss of motion. (44.)

On the question of the posterior roots of the spinal nerves being subservient to motion, as maintained by Bellingeri, or to sensation, as taught by Magendie and Bell, the present author merely refers to the experimental inquiries detailed in our last number, and to the confirmation which he conceives they have derived from the experiments of Rolando and Schoepf; and he concludes that his own experiments, and those of the two authors now mentioned, throw great doubt on the doctrines of Magendie, and prove that the posterior roots are competent to determine motion. (45.)

II. The second proposition enunciated by Bellingeri is, that *the cerebral lobes, many cerebral nerves, the anterior strands of the spinal chord, and the anterior roots of the spinal nerves, are subservient to motions.* In proof of the accuracy of this tenet, he refers to the experiments of Rolando, Flourens, Schoepf, and his own observations on the origin of the nerves devoted to motion, all of which, he maintains, issue from the brain or its peduncles.

Thus he reminds us that the third pair of nerves, and the sixth pair, which are evidently exclusively motiferous nerves, and the hypoglossal, which is indeed chiefly a motific nerve of the tongue, all issue from productions of the brain; and therefore he infers that it is reasonable to conclude, from anatomical considerations alone, that there are parts of the brain alone which are subservient to motion. In using this term, *parts of the brain*, Bellingeri adds, that he does not by this understand that the whole brain is subservient to motion, but that, while part of it presides over the intellectual functions and all the sensations, part may also be devoted to the regulation of motion. This leads him to explain his ideas on the brain proper, which he does in the following manner.

The brain he distinguishes into two parts, an upper and a lower. By the former he understands that part of the brain which is situate above the level of the lateral ventricles, that is to say, the mesolobe or *corpus callosum*, including this body; and by the lower position he understands that placed below the lateral ventricles, forming the inferior place, and comprehending chiefly the *corpora striata*, the optic *thalami*, and the *crura* or peduncles of the brain. This division, he maintains, is not arbitrary, but traced in a great degree by nature, by means of the lateral ventricles. The upper portion he regards as destined to fulfil the noble functions of the mind, for instance perception, with reasoning judgment; while to the lower portion he attributes the regulation of sensiferous and motific or voluntary life. Upon this principle he regards the *corpora striata* as the centre of the sense of smell, the optic *thalami* as the centre of the sense of vision, and, at the same time, both the *corpora striata* and optic *thalami* as organs destined to produce motions. (50.)

The arguments adduced by the author in support of these views are too lengthened to allow us here to repeat them. It is sufficient to say, that he refers to the authority of Meckel, Magendie, Saucerotte, Serres, Rolando and Fodera, to prove the truth of the general fact, that injuries and diseases of the superior part of the brain affect chiefly the intellectual functions; that injuries and diseases of the middle lobes and *corpora striata* affect principally the motions of the abdominal or sacral extremities; and that injuries and diseases of the optic chambers and posterior lobes of the brain affect chiefly the motions of the thoracic extremities. He at the same time explains an apparent contradiction derived from the experiments of Bouillaud and some others; viz. that though the removal of the cerebral lobes does not produce palsy in animals, yet in the human subject disease of these lobes is followed by palsy of various kinds, by stating that the inflammation or irritation of these lobes is followed by the latter effect, by the irritation being propagated or extended to those parts of the brain which are devoted to motion, for instance, the *thalami* and *crura* of the brain.

A short recapitulation of the proofs deduced from the experiments of various inquirers, and especially his own, to demonstrate the subservience of the anterior strands of the spinal chord and the anterior roots of the spinal nerves to the motions of the limbs, concludes this article.

III. M. Bellingeri then proceeds in his second chapter to the exposition and demonstration, by means of anatomico-physological proofs, of the great principle of all his reasonings,—the doctrine of Nervous Antagonism. After repeating briefly the anatomical considerations as to the fourth and sixth pairs of nerves, already adduced at p. 402 of our last volume, he proceeds to consider the phenomena of antagonism in the iris, in the lower jaw, between the third and seventh pair of nerves, and between the intercostal and pneumogastric nerves.

a. The iris, he observes, derives nerves from two sources,—the third and the fifth pairs,—the first of which issues chiefly from the *crura* or peduncles of the brain, and the second, or its larger portion, at least from the productions of the *cerebellum.* Of the two nerves, therefore, supplying the iris, one is of cerebral, and the other of cerebellic origin; and as this delicate curtain undergoes two species of motion, the point to be determined is, whether both the nerves specified influence the motions of the iris, and whether one produces one sort of motion, and the other the opposite; and to determine this point, he makes a very ingenious application of the apparently contradictory experiments of Mayo and Magendie.

The former author showed that division of the third pair produces contraction of the iris, and thereby dilatation of the pupil, without susceptibility of subsequent contraction, and that, conversely, division of the fifth pair induces no change in the alternate motions of the *iris*; whence he inferred that only the third, and not the fifth pair, presides over the motions of the iris. These inferences, however, were opposed by those of the experiments of Magendie, who showed that, in dogs and cats, in which the ciliary nerves are formed of the third and fifth pairs, division of the latter nerve is followed by contraction of the iris, and thence dilatation of the pupil. Bellingeri, therefore, infers, that the experiments of Mayo and Magendie, though opposite, lead to the same results. It is possible, he adds, that this difference may depend upon the differences in the animals selected as the subject of experiment, since Mayo employed pigeons, and Magendie dogs and cats; and the latter author observed that, in rabbits, the ciliary nerves are formed not of the fifth, but of the third pair only, and that, notwithstanding division of the fifth pair in rabbits produces in the iris a phenomenon the reverse of that observed in dogs and cats, viz. contraction of the pupil, or greater expansion of the iris.

In the difficulty resulting from these ambiguous results, M. Bellingeri has recourse to the evidence afforded by the respective effects of different degrees or forms of disease of the brain and *cerebellum*, or the motions of this perforated membrane. In cases of cerebral softening, he observes, contraction of the pupil is accompanied with muscular contractions or spasms, and when the latter are succeeded by palsy, the pupil is dilated. Pathology shows that inflammation of the brain proper, or of the cerebral lobes, produces contraction of the pupil; and, conversely, apoplexy followed by palsy, generates dilatation of the pupil or *mydriasis*, (p. 67.) The brain, however, acts on the pupil only through the medium of the third pair, a cerebral nerve, and not by means of the fifth pair, which is a cerebellic nerve. If, therefore, he concludes, cerebral inflammation, which produces spasm propagated from the third pair, causes constriction of the pupil, and cerebral apoplexy, or a more intense lesion, which induces palsy, causes by the same nerve dilatation of the pupil, it is a proof that the third pair produces constriction of the pupil, and determines the motions of contraction of the iris, (p. 68.)

He further argues, from the phenomena of a case recorded by Brichetau, in which softening of the annular protuberance without affection of the brain or *cerebellum*, gave rise to *opisthotonos* of the head and spasm of the muscles of the eyes, with squinting, contraction and immobility of the pupils, that the third pair must have been chiefly affected, and that this affection produced the contraction of the iris, and the constriction of the pupil.

These various considerations lead him to form the conjecture, that, notwithstanding what he had already said, it might be that the third pair produces in the iris motions of contraction and relaxation, and that the fifth pair is destined to regulate the organic or automatic functions only of that membrane, especially its organic sensibility, as Mayo believes. In confirmation of this idea he observes, that the origin of the third pair is not, strictly speaking, single, but twofold, viz. cerebral and cerebellic; and that the third pair of itself produces various opposite motions of the globe of the eye, to which it is distributed, and may in the iris in like manner rule the motions of contraction and dilatation together. (71-72.)

In the whole of this hypothesis the author presumes that the iris is the seat of one motion only, the other being merely the negative state of the moving; that the contractile is the active state of the iris, and that of the dilated pupil the relaxed, passive, or inert state of that membranous web; that the means of maintaining this contractile or mobile state of the iris depend chiefly, excluding organic or mechanical changes in the iris itself, as adhesion, closed pupil, &c. are the integrity of the third pair, and continuance of the communication of that nerve with the eye and iris. The third pair, in short, is, according to Bellingeri, the only motific nerve of the *iris*.

The question then comes to be, why does the fifth pair, send filaments to the *iris*, and why, upon dividing the fifth pair, is the pupil dilated, or does the *iris* undergo relaxation. The reason is, he answers, that the filaments of the fifth pair are subservient only to the organic properties of the iris, its circulation, nutrition, and secretion,—and not because the iris has become immovable, but because these organic properties are impaired or extinguished,—because, in short, the iris is insensible to the stimulus of light, and hence does not obey the impressions made on it.

He has still, however, another fancy regarding the services of the fifth pair of nerves, to which, from the phenomenon of *mydriasis* in *hydrocephalus*, he has been led to ascribe the property of relaxing the *iris* or dilating the pupil. We must, however, acknowledge our incapacity to perceive the conclusiveness of this inference, unless in the single sense that, as the fifth pair regulates the organic properties of the membrane, and as some of these properties may be, on the abstraction of the stimulus, to reduce the iris to its inert, passive, or quiescent state, it may in this sense perform the duty of relaxing the membrane and dilating the pupil.

The chief objection to the whole of these reasonings is, that the author by no means establishes exclusively the existence of antagonism either in action or in nervous influence on the *iris*. If he maintains that dilatation of the pupil is the mere suspension or cessation of its contractile power, then it is clear that the admission of two opposite actions is unnecessary. If, in like manner, he maintains, that the third pair of nerves are the motific agents of the *iris*, it is surely not only inconsistent, but superfluous, nay, almost incomprehensible, to represent, that some of its filaments cause contraction or constriction of the pupil, and some produce dilatation; since the mere inert or passive state of the former would produce the same effect as the presumed active state of the latter. Upon the whole, we do not think that the existence of antagonism is, in this instance, so clearly demonstrated as that of a concurrent or combined action of nervous filaments to the general purposes of the motions of the *iris*.

b. M. Bellingeri, however, is more successful in his demonstrations of the existence of antagonism in the muscles of the lower jaw. Its principal motions, it is well known, are depression by means of the digastric muscles, and elevation by means of the temporal and masseter muscles. The two latter muscles are supplied by nerves from the small portions of the fifth pair only, the *Nervus masticatorius* of the author, while the action of the digastric muscles is under the particular influence of the seventh pair or the facial nerve. Palletta, however, has shown, that the small or motific portion of the fifth pair arises from the upper peduncles of the *cerebellum*, and must, therefore, be regarded as a cerebellic nerve; while the seventh pair, or facial nerve, issuing from the external side of the trapezoidal floor of the ventricle, appears to be partly a cerebral nerve. The reason, therefore, that these muscles of the lower jaw receive their nerves from the brain and from the *cerebellum*, appears to be, that the small or motific portion of the fifth nerve acts as an antagonist to the seventh or facial nerve.

The existence of this antagonism between these two nerves is well demonstrated by the experiments of Magendie and Schoepf, and the author might have added those of Bell and Mayo. The first author, it is known, divided the trunk of the fifth pair in rabbits on both sides, and immediately the jaw hung pendulous. Conversely, Schoepf, having removed entirely the cerebral lobes in a rabbit, caused, among other symptoms, *trismus* of the lower jaw,—in consequence, as the author infers, of the interrupted action of the facial nerve. (75-76.)

c. The author next traces a degree of antagonism between various other pairs of nerves; for instance, between the third and the seventh pairs in the muscular apparatus of the eyelids; between the fifth and seventh in various motions and sensations of the face; between the hypoglossal and the glosso-pharyngeal in the motions of the tongue; and between the nervous filaments sent to the muscles of the neck, trunk, and extremities.

d. The most elaborate, however, and perhaps the most important, part of this doctrine, he refers to the antagonism existing between the intercostal nerve and the pneumogastric nerve, in the course of which he states several peculiar opinions on the influence of these nerves on the motions of the internal organs, and of the muscular parts to which they are distributed.

Anatomy teaches that the *larynx*, the windpipe, the *bronchi*, the lungs, and the heart, are supplied with nerves from the intercostal and the pneumogastric, conjoined with the internal branch of the accessory nerve; that the *pharynx*, the *æsopha-*

gus, the stomach, *duodenum*, and liver, are put in action by the concurrent influence of the pneumogastric and the intercostal; and that, conversely, the spleen, *pancreas*, intestines, the kidneys, the urinary bladder, the womb in females, and the *testes* in the male, are provided with nerves almost solely from the intercostal, and receive from the pneumogastric few filaments insusceptible of demonstration, though it is known that a large filament of the pneumogastric is invested in the coeliac plexus. The intercostal, further, gives the diaphragm many filaments which are associated with the phrenic nerves; it sends filaments to the *stylo-pharyngei* and *stylo-glossi* muscles; to the sterno-thyroid and crico-thyroid; to the *intertransversales* of the spine, to the intercostals, the *scaleni*, the *longi colli*, and the *quadrati lumborum*. The same trunk provides almost exclusively with nerves all the arteries of the body, excepting the aorta, where it is united with the pneumogastric.

This distribution shows that those parts which possess organic sensible contractility, and which are endowed with the double motion of contraction and rapid and energetic dilatation, are provided with nerves both from the pneumogastric and from the intercostal at the same time; for instance, the muscles of the *larynx*, the heart, the *pharynx*, the *œsophagus*, and the stomach; and the diaphragm receives nerves also from two sources, the intercostal and the phrenic. Conversely, those muscular organs which are endowed with the insensible organic contractility; for instance, the small intestines, excepting the *duodenum*, the large intestines, the testicles, and the kidneys and their excretory ducts, are provided with nerves from the intercostal solely. The bladder, again, and the womb, receive nerves from the intercostal without the pneumogastric, and also filaments from the sacral nerves;—and these organs are endowed with organic insensible, and sometimes sensible contractility, as to constriction,—not as to dilatation, which takes place slowly and less actively and evidently than the motions of contraction. The arteries also possess a form of sensible contractility of constriction, and less sensible contractility of dilatation.

Considering, therefore, that these organs or muscular *viscera* endowed only with a prompt, evident, and active faculty of contraction, but with successive dilatation, slow and obscure—for instance the womb, the urinary bladder, and the large intestines—receive nervous branches from the intercostal trunk alone, and not from the pneumogastric, he infers that in the other muscular organs, endowed with a double contractile motion, followed by speedy dilatation, for instance, the heart, the *pharynx*, the *œsophagus*, and the stomach, and also the muscles of the *larynx*, which are supplied with nerves both from the intercostal and the pneumogastric,—the intercostal nerve produces in these organs the motions of contraction, and the pneumogastric those of dilatation.

As a preliminary step to the demonstration of the principle now enumerated, he first undertakes to show that both these nerves regulate the motions of the organs to which they are distributed.

Adverting merely to the opinion of Rolando, that the pneumogastric nerve is a sensiferous one, he maintains strenuously that it is a motiferous, both from anatomical and physiological considerations. Thus he refers to the testimony of Valsalva, who saw division of the pneumogastric followed by frequent efforts to vomit, derangement of digestion, and arrest of the food in the *æsophagus;* all which results were confirmed by the experiments of Dupuy and Broughton; and he reminds the reader that Mayo having divided the nerve, and irritated its lower extremity, produced contraction in the *æsophagus.*

The influence of the same nerve over the motions of the stomach, he maintains, is equally demonstrated by the experiments of Breschet, Milne-Edwards, Legallois, and Broughton; and he denies altogether the validity of the conclusions deduced by Wilson Philip, that the pneumogastric filaments influence the secretion of the gastric juice.

The influence of the pneumogastric nerve over the motions of the *larynx* next comes under review; and, in proof of the truth of this principle, he adduces the authority of the experiments of Galen, Legallois, Magendie, and Broughton. Legallois, indeed, showed that division of the recurrent nerves, as well as of the pneumogastric trunk, produces constriction of the *glottis*, by approximating the arytenoid cartilages,—that is, by palsy of the muscles of these cartilages; Magendie observed that division of the inferior laryngeal or recurrent nerve causes palsy of the dilating muscles of the *glottis*, *(crico-thyroidei, crico-arytaenoidei postici,)* which is no longer opened in the act of inspiration; and Broughton remarked, that, upon dividing the pneumogastric nerve on both sides, though the motions of the diaphragm are unaffected, those of the lungs are almost insensible.

These arguments, so far as the muscles of the *larynx* and the nerves by which they are supplied, are concerned, are undoubtedly plausible, and rather strong; for it cannot be denied, that the superior and inferior laryngeal nerves are distributed chiefly, if not exclusively, to muscles, and must therefore be viewed as principally nerves of motion. As it might be argued, however, that these branches of the pneumogastric nerve are not of themselves motiferous, but derive this property from *anastomosis*, or conjunction with the internal branch of the accessory nerve, Bellingeri anticipates this objection by answering, that, as the pneumogastric nerve sends off the superior laryngeal nerves before the internal branch of the accessory is conjoined with it, it must be admitted, that the pneumogastric alone is motiferous. The experiments, indeed, of Magendie, show that the superior laryngeal nerves influence the motions of the *larynx*, as this author found that the division of these nerves impedes the motions of the arytenoid cartilages, and annihilates the motions of constriction of the *glottis*; and Bellingeri hence infers, that the superior laryngeal nerve is the antagonist of the inferior laryngeal or recurrent nerve; the former producing constriction, the latter dilatation, of the *glottis*.

Here we must be permitted to observe, that this statement is not quite intelligible, in so far as it is not entirely accordant, according to our views, with anatomical facts. It is no doubt true, that the superior or internal laryngeal nerve is distributed to the *arytaenoideus transversus*, the *arytaenoideus obliquus*, and the *crico-arytaenoideus lateralis*, which have the power of drawing together, more or less closely, the arytenoid cartilages, and thereby contracting the aperture of the *glottis*; but it must be observed, that it also distributed to the *crico-arytaenoideus posticus*, the *thyro-arytaenoideus*, and the *crico-thyroideus*, all of which have the faculty of separating, in different degrees, the arytenoid cartilages, and thereby enlarging the aperture of the *glottis*. It is clear, therefore, that in this case the filaments of one and the same nerve supply muscles which, in action, antagonize each other; and it is inconsistent, therefore, with correct reasoning, to represent the superior laryngeal nerve as antagonizing the inferior only, when it also antagonizes its own filaments. It is an anatomico-physiological fact, that the filaments of the superior or internal laryngeal nerve contribute to dilate or enlarge the *glottis*, as well as those of the inferior laryngeal, or recurrent nerve.

These observations, however, we make merely in passing; and we resume the train of argument pursued by Bellingeri, in proving the pneumogastric to be a motiferous nerve.

In further confirmation of the justice of this view, he directs attention to its origin and structure. Its filaments, he observes, issue from the restiform processes, which are productions of the lateral strands of the spinal chord; and, from the same restiform processes above the origin of the pneumogastric nerve arises the glosso-pharyngeal, and, higher still, though from the same processes, issue many filaments of the facial; and, lastly, from the same processes, below the origin of the pneumogastric, arise many filaments of the accessory nerve, and thus descending all the filaments of the accessory issue from the lateral strands of the chord, as the author shows in his dissertation *De Medulla*

Spinali, &c. examined in last Number. As these three nerves, therefore, viz. the glosso-pharyngeal, the facial, and the accessory, are assuredly motiferous, and not sensiferous nerves, the author argues that it is most natural to think that the pneumogastric, which issues from the same strands, must possess the same properties, or is a motiferous, and not a sensiferous nerve.

The author takes care also to avail himself at this point of an argument to prove that the restiform or lateral strands of the spinal chord are destined to regulate involuntary motions only, or those of the organic life, from the circumstance, that all the three nerves now mentioned are concerned principally, if not exclusively, in the regulation of motions of this class.

He enters next upon rather a long discussion to prove that the pneumogastric nerve is *not* a sensiferous nerve; and he refers to the experiments of Legallois to prove that this nerve has no influence over the sensation of pulmonary anxiety, and to those of Dupuy, that it has none over the sensation of hunger. The absence of ganglions in the course of the pneumogastric is also an argument of the same tendency; and he finally maintains, that all the internal sensations, and those especially which are connected with appetites and uneasy feelings, giving rise to involuntary actions in muscles, are to be referred not to the influence of the pneumogastric filaments, but to that of the filaments of the intercostal.

Having in this manner maintained his principles regarding the exclusive motiferous properties of the pneumogastric, Bellingeri proceeds to demonstrate another proposition in this part of his theory, viz. that the intercostal nerve, though principally a sensiferous one, nevertheless regulates certain motions, and in doing so is an antagonist of the filaments of the pneumogastric. The intercostal nerve, in short, is, according to Bellingeri, not only the minister of organic sensibility to the organs of the chest and belly, but it is the agent of all motions of contraction. Thus, he remarks, the experiments of Broughton, who, having divided the pneumogastric on both sides, found the motions of the diaphragm unaffected, but those of the lungs insensible, show that this nerve serves to dilate the lungs, since their first motion is that of dilatation, succeeded, however, by contraction or constriction. Respiration then becomes difficult, with long, slow, and distinct inspirations, followed by rapid, violent, and forced expirations,—depending either on rapid contraction of the lungs and diaphragm, or on the diaphragm alone contracting with greater energy when no longer resisted by the expanding tendency of the lungs. The author, therefore, infers, that, in consequence of this experiment, either the lung is not dilated, or it is dilated slowly and imperfectly, and contracts with excessive rapidity,—that the pneumogastric is therefore the expanding agent of the lung, and, by indirect induction, that the intercostal must induce the contracting motions of that organ.

Before proceeding to the arguments next adduced in support of this opinion, we must not pass from this now specified, without saying that it is by no means conclusive; that it is pregnant with a very gross oversight, which renders it entirely fallacious; and that the author has, in our opinion, attempted to carry it a great deal farther than the principles of just induction warrant.

When the pneumogastric nerve has been divided, the imperfect dilatation of the lung which ensues, does not depend upon the extinction or suspension of any property possessed by that organ, or directly communicated to that organ, by the pneumogastric trunk or filaments. The imperfect dilatation, and the eventual cessation of dilatation, depends upon the injury inflicted on the superior or internal and inferior laryngeal or recurrent nerves, and upon the simultaneous suspension of the voluntary action of the dilating muscles of the *glottis*, viz. the *crico-thyroideus*, the *crico-arytaenoideus posticus*, and *thyro-arytaenoidei*. These muscles maintain, without any effort on the part of the animal, an open state to a certain extent of the *rima glottidis*; and during every inspiration they are involuntarily, or rather instinctively, put in action, so as to open that aperture more completely. The moment, however, that either the trunk of the pneumogastric or the recurrent branch is divided, the instinctive action is suspended, the arytenoid cartilages collapse towards each other, and diminish much the transverse diameter of the aperture. It is also not improbable that, at the same time, the *arytaenoidei obliqui* and *arytaenoidei transversi*, act with preternatural force, being no longer antagonized by the muscles above specified. At all events, it is certain that the chief impediment to respiration consists in the aperture being diminished, and thereby, the animal being unable to inspire with the instinctive efforts, the same quantity of air, or with the same force as in the healthy state, in the lungs consequently being deprived of their most efficient expanding agent,—the presence of the elastic atmospheric air, and in being thus thrown into an inert and comparatively torpid state.

In this manner we can account for the contraction or the non-dilatation of the lungs and all its effects, in a sufficiently clear and satisfactory manner, without having recourse to a supposition so singular, and, we may add, so much at variance with all the analogies of vital action, as that of the active dilating faculty of the lungs, or an equally active contracting faculty. When the air ceases to enter the *larynx* and *trachea* in sufficient quantity and with due force, the lungs cease to be expanded, the vesicles necessarily collapse to a certain extent, or, at least, are not alternately and duly expanded and contracted; the blood does not move readily from the small branches of the pulmonary artery into those of the pulmonary veins; it at length moves slowly and stagnates, and is not duly aerated; accumulation takes place in the branches and trunk of the pulmonary artery and the right side of the heart; the peripneumony of chronic *asphyxia* ensues, and death takes place with all the symptoms of interrupted respiration from non-dilatation of the lung.

It should never be forgotten, in giving an explanation of phenomena, either physical or physiological, that it is inconsistent with the principles of true philosophy to assume the existence of more causes than are adequate to account for the effects.

By what means the intercostal nerve can operate as a contracting agent, we acknowledge our incapacity to discover. The contraction or collapse of the lungs is, so far as can be understood, effected, in the first place, by the return of the dilating muscles of the chest to their state of inaction, and, in the second place, by the action of the expiratory muscles or the abdominal. If the intercostal nerve has any share in accomplishing this purpose, it must be by its regulating the mere organic sensibility of the lungs, and thereby enabling them to collapse when the expanding agents cease to operate.

After submitting these observations, we proceed with the train of reasoning pursued by the author, who next adduces anatomico-physiological arguments in support of the proposition now under consideration.

While the pneumogastric nerve, he tells us, issuing from the restiform bodies, is connected with the *cerebellum*, the intercostal is connected at once with the brain and *cerebellum*,—communicating as it does with the fifth pair, a cerebellic, and the sixth pair, a cerebral nerve, and receiving, as Bellingeri thinks he has determined, filaments, from the anterior and the posterior roots of the spinal nerves. He infers, therefore, agreeably to the principles which he conceives he has established, as mentioned in last Number, and more fully in the present treatise, that, since the *cerebellum* and the cerebellic nerves produce in the trunk and extremities motions of extension and abduction, while the brain and cerebral nerves give rise to motions of flexion and adduction, the former being equivalent to dilatation or expansion, the latter to contraction,—the pneumogastric, as a cerebellic nerve, ought to produce dilatation in the organs to which it is distributed, while the intercostal, as receiving filaments from the brain, ought to contribute not only to sensibility, but to motions of contraction.

The author then refers to such motions as yawning and sneezing in confirmation of this opinion. But we must contend, that he still overlooks the fact, that even in these motions, which, indeed, are of a peculiar and instinctive or involuntary character, the prolonged and excessive expansion or dilatation of the lungs in the former case is produced by an extreme and a peculiar action of the expanding muscles of the chest, viz. the diaphragm and *pectorales*, and the collapse or apparently sudden and forcible contraction of the lungs is produced by a peculiarly convulsive motion of the expiratory muscles. In other respects, his considerations are rather ingenious and plausible views, than conclusive arguments. Thus it is doubtless the fact, that, in the instinctive motions of respiration, for instance, yawning and sighing, and in those involuntary changes induced by mental emotions, the motions of extension and abduction of the extremities are simultaneous with those of expansion of the lungs and *diastole* heart; and conversely, the motions of flexion, constriction, and adduction of the extremities are associated with those of collapse of the lungs and contraction of the heart. But we do not perceive that it follows as a necessary consequence that, therefore, the expansion of the lungs and the *diastole* of the heart are regulated by a cerebellic nerve, like the pneumogastric, or that the collapse of the lungs and the *systole* of the heart are effected by virtue of a cerebral nerve like that of the intercostal trunk.

With the view, notwithstanding, of disputing every inch in the argument, and adducing all the evidence practicable to bear on the question, Bellingeri next proceeds to question the accuracy of a statement of Scarpa regarding the origin or spinal connections of the intercostal nerve. The learned professor of Pavia has not long ago represented, in a paper published in the *Annali Universali di Medicina* of Omodei, that the intercostal nerve arises from the posterior roots of the spinal nerves only, and has no communication with the anterior roots. This statement M. Bellingeri feels it requisite to controvert; and, however much he respects the great anatomist of Italy, he tells us, he cannot distrust the evidence of his own senses, which demonstrate that the filaments of the intercostal issue from the anterior branches of the spinal nerves,—formed of the concourse or mixture of the anterior roots with the posterior roots; and hence the filaments of the intercostal are composed of fibres, some of which issue from the anterior, and others from the posterior roots. The inference that Scarpa deduces from the anatomical character now specified, viz. that the intercostal is merely a sentient and not a motiferous nerve, Bellingeri, in like manner, controverts upon the ground of the arguments already adduced, and those also yet to be adduced, relative to the influence of the cerebral *crura* upon the organs of motion.

IV. We have now to proceed to the third general proposition enunciated by Bellingeri;—that *the lobes of the brain produce the motions of flexion.* To demonstrate the truth of this proposition, he adduces evidence from two sources; 1*st*, that of experimental inquiries conducted by other physiologists; and 2*d*, that from the proofs of pathological anatomy.

Under the first head we find the experiments of Magendie, Flourens, Schoepf, Serres, Saucerotte, and Desmoulins, relative to the effect of removal or injuries of the cerebral lobes; and these several experiments, having been made by various inquirers with different views, must be allowed to possess greater validity in establishing the principles maintained by M. Bellingeri, than if he had instituted a series of experiments with the express intention of demonstrating what he wished. Many of these experiments having been at different times more or less fully under consideration, are already well known to the readers of this Journal, and need not now be repeated. Their leading and essential results are to the following effect.

Removal or injury of the anterior lobe of the brain is followed by flexion of the opposite abdominal extremity; and removal of both anterior lobes induces the flexion of both abdominal extremities. (Serres.) Division or removal of the posterior lobes of the brain is followed by flexion of the thoracic extremities, (Serres and Saucerotte;) and removal or destruction of the hemispheres of the brain causes an irresistible motion of progression forwards; while conversely, wounds or destruction of the *cerebellum* are followed by a series of retrograde motions, (Magendie and Desmoulins.) Destruction of both *fasciculi* of the *infundibulum*, and to a small extent of the two anterior pyramidal bodies, leaving the *corpora restiformia* entire, causes palsy, with rigidity and inflexible extension of the inferior extremities, and immobility of the superior extremities, (Meyranx;) while conversely, to a similar lesion at the level of the *calamus scriptorius*, incomplete palsy, with rigidity and inflexible extension in the thoracic extremities succeeds, and the abdominal extremities present similar motions to those which are observed in the act of kneading. In all these experiments, the author repeats, the motions which continue or prevail after experiment are those which proceed from the uninjured parts; that is to say, the motions of extension which are employed in retrogression depend on the *cerebellum*; while those of flexion, which are employed in progression, depend on the brain.—(P. 114.)

The proofs derived from pathological anatomy consist of a series of twenty-three cases, illustrated by dissections, from Morgagni, Dan de la Vauterie, Lallemand, Bouillaud, Avisard, Martin Solon, Piedagnel, Hutin, and Serres,—in which, with symptoms of palsy or apoplexy, was conjoined a greater or less degree of rigid or inextensible flexion of the arms, or tetanic rigidity of the head or neck. These cases are too much detailed, and occupy too much space, to give them even in an abridged form. In order, however, to show the manner in which they are applied to support the truth of the proposition now under consideration, we shall give a short sketch of the conclusions deduced by the learned author himself.

From these investigations M. Bellingeri thinks it results, that inflammation or any irritation of the cerebral lobes often produces spasm, more or less permanent, in the direction of flexion, and sometimes also of adduction, of the extremities; and from this pathological fact he infers, that the cerebral lobes produce the motions of flexion and adduction of the extremities. Pathology, therefore, shows, that not always in cases of inflammation or irritation excited in the cerebral lobes, is the spasm specified observed in the direction of flexion and adduction; but often there are either convulsions, or there is no tonic spasm, in any direction; or there is genuine palsy; or there is no lesion in the motions of the system of voluntary muscles; and this variation, he thinks, depends partly and principally on the varied seat of the inflammatory process, or of the irritation in the cerebral lobes, and partly on the nature of the morbid affection existing in these lobes.

As to the influence of the seat of the action, Bellingeri thinks it is established by the observations adduced or quoted by him, and in which care has been taken to specify the locality and the point of lesion in the cerebral lobes, that it is either in the *optic thalami*, or in the *corpora striata*, or in the posterior part of the ventricles, or in the middle lobe, and more frequently in the posterior lobule of the hemispheres. Further, there is often met as a cause of such spasm, inflammation or bloody injection of the *pia mater* or arachnoid membrane, especially at the upper surface of the brain; hence the said parts of the cerebral lobes are those which influence most the motions of the extremities; and if they are affected, lesions of these motions will ensue; if other parts of the brain are irritated, other symptoms will be betrayed, without disorder of the faculty of motion.

The nature of the morbid affection of these parts of the cerebral lobes devoted to motion, he represents as adequate to produce spasm or palsy. Irritation of every kind, he argues, produces spasm; while disorganization, destruction, or intense compression of those parts of the brain subservient to motion, induces genuine palsy with relaxation.

" I will admit, therefore," he concludes, " that irritation of any part of the cerebral lobes may exist without producing spasm in the direction of flexion or adduction of the extremities; but whenever the said spasm exists we ought reasonably to infer that there is an irritation of inflammatory or other character in the cerebral lobes."

The author then draws the following conclusions.

"1. There are diseases of the brain without any lesion in the moving faculty, either palsy, or spasm, or convulsion; and this, in our opinion, depends on the variable seat of the morbid affection, and proves that not all the parts of the cerebral lobes increase an influence over the motions. 2. Irritation created in some parts of the cerebral lobes, most frequently induces spasm, transitory or permanent, in the direction of flexion, and also adduction of the muscles of the extremities. 3. This spasm is most frequently followed by genuine palsy,—which indicates that with the irritation was associated either an exhaustion of the nervous power,—or that the state which produced at the beginning simple irritation, with the course of time, induced intense compression or disorganization of the nervous tissue. 4. Those diseases of the cerebral lobes which induce in the extremities genuine palsy not preceded by spasm, seem to indicate that the pathological state of the brain from the commencement was such as to produce not irritation, but compression or remarkable alteration capable of speedily inducing palsy. These observations, however, are imperfect, because, for the most part, the state of the muscular system was not described, but merely defined by the general denomination of palsy or *hemiplegia*; and it further was still to be determined, in similar cases, whether the palsy was complete in every direction, that is, in the directions of flexion, extension, abduction, and adduction,—a circumstance which it is impossible to ascertain, unless the attendant produces by external agency a species of motions calculated to show whether the patient can spontaneously execute the opposite motions. 5. The diseases of the cerebral lobes which induce genuine palsy may, by the laws of antagonism, give rise in the small extremities to a state of tonic extension, that is a degree of extension depending on the natural tone existing in the exterior muscles left unaffected. 6. From these principles it is inferred, that certain parts of the cerebral lobes preside over motions of adduction and flexion of the extremities, of the head and of the trunk. And 7. Spasmodic flexion and adduction is a symptom characteristic of *encephalitis*, or irritation established in the cerebral lobes."—(Pp. 171–172.)

After these doctrines on the muscles of the extremities and trunk, he adds, that he is further persuaded that attentive examination of many pathological cases will instruct us also in the influence, which the cerebral lobes exercise over the muscular system of the face, the eyes, the tongue, the pupil, and the urinary bladder; but, as this inquiry would be too lengthened, he defers it to another season, and confines himself to a few remarks on the combination of these derangements in muscular action, with or without *anaisthesia*. After a short collation of the most authentic cases, he arrives at the conclusion, that the diseases of the cerebral lobes which produce genuine palsy or spasmodic flexion are sometimes associated with *anaisthesia*, or insensibility of the skin,—as distinguished from muscular sensibility.

V. The fourth proposition enunciated by Bellingeri is, that the *cerebellum is subservient to the motions of extension ;* and, in order to demonstrate the validity of this principle, he adduces physiological arguments, evidence derived from the experiments of other inquirers, and pathological observations.

The first physiological argument adduced in favour of this principle is derived from the comparative weight of the brain and *cerebellum* at different ages. The weight of the *cerebellum* in the adult is known by the observations of Chaussier, he remarks, to be about the eighth or the ninth part of the weight of the brain ; and in the new-born infant it is only the sixteenth or eighteenth part of the weight of the brain. He does not appear to be aware of the fact, that Soemmering had estimated it, after various trials, at the sixth or seventh part of the weight of the brain proper,—a difference which would make the proportional difference of the adult and infant brain and *cerebellum* still more conspicuous. The weight of the *cerebellum*, therefore, comparatively, to that of the brain, is more than double in the adult of what it is in the infant ; and, he maintains, that this predominant weight is connected with a peculiar preponderance of the motions of extension over those of flexion. He first observes, that the motions of extension are more predominant in the adult than in the infant, which is hence incapable of sustaining the head and trunk, and of supporting itself on the legs,—positions which require strength in the extensor muscles ;—while in infants the motions of flexion predominate most. *Secondly*, it appears also reasonable to Bellingeri to attribute to the greater developement of the brain in the fœtus, the position of the whole person in the direction of flexion ; and, as in the adult, the weight of the brain is always greater than that of the *cerebellum*, hence it is also, in consequence of the same arrangement, that the action of the flexor muscles in general predominates over that of the extensors.

In illustration of the truth of these inferences, he informs us that he has observed in his own children, as in many others, that those, in whom the occipital region is much developed, stand on their feet and walk at an earlier period, than those in whom the same region is depressed, or little elevated ; and, as standing and progression require strength in the extensor muscles, he thinks the early perfection of these faculties is connected with the larger developement of the *cerebellum*.

The experimental proofs are derived from the experiments of

Zinn, Saucerotte, Rolando, Serres, Bouillaud, and Fodera. The general result is, that irritations excited in the *cerebellum* induce *opisthotonos*, or spasmodic extension of the head, trunk, and posterior extremities; that in some instances of lesions inflicted on the *cerebellum*, these spasmodic motions may be so violent as to throw the animal completely backwards (Bouillaud); and that the motion of retrogression observed by Magendie and Bouillaud, in cases of injury or irritation of the *cerebellum*, is to be explained by the spasmodic action thus induced in the extensor muscles, by which the animals are involuntarily compelled to move backwards. Fodera in like manner observed, after removing the middle superior part of the *cerebellum* in a Guinea pig, that the head was thrown backwards, the hind-legs were forcibly separated, the fore-legs straight and rigid, and the position of the animal was that of tumbling backwards;—showing, Bellingeri observes, that the *cerebellum* produces the erection of the head and trunk, extension of the thoracic extremities, and abduction of the abdominal extremities.

The pathological evidences adduced by Bellingeri in support of the truth of this proposition, consist of eleven very pointed cases of disease of the *cerebellum* in some of its parts, and giving rise to different degrees of derangement in the muscles of the head, trunk, and extremities. Of these it is unnecessary to give more than a short abstract of the general results.

It may be concluded, that, since the various facts already adduced, show, in the opinion of M. Bellingeri, that every and any irritation excited in the *cerebellum* produces spasm in the extensor or elevator muscles, and so also in the abductors, (p. 214, Experiments of Fodera;) and conversely, destruction, incision, or excision of a considerable portion of the *cerebellum*, induces palsy in the extensor muscles, it must be regarded as a proof that the *cerebellum* is not destined to produce every kind of motion, but some only, and especially those of extension, elevation, and abduction. Conversely, since pathological observations show that irritations excited in the cerebral lobes induce spasm in the direction of flexion of the trunk and extremities, and abduction, especially of the thoracic extremities, and, on the other hand, destruction and disorganization of the same lobes induce palsy of the flexor muscles, it is evident, he argues, that the cerebral lobes produce motions of flexion in the trunk and extremities, and also those of adduction; "and thus," he concludes, "is demonstrated the truth of the doctrine of Nervous Antagonism promulgated by me."—(P. 215.)

"I do not, however, mean," he adds, "that the *cerebellum* produces only motions of extension and abduction; and the cerebral lobes determine only those of flexion and adduction; because, as there are in the human body many other motions, as elevation and depression, pronation and supination, constriction and dilatation, &c.—other nervous organs would be required to produce such motions; but it is my intention to demonstrate that one species of motions is produced by the brain proper, and an opposite species of motions by the *cerebellum.*"

" I have proved my assumption as to the principal and most conspicuous motions, as those of flexion, extension, abduction and adduction; and I am certain that an attentive examination of the experiments and pathological observations already recorded will illustrate to us the distinct influence of the brain and *cerebellum* over the other kinds of motions. I do not here undertake this investigation, which would prove too lengthened; and I am satisfied with simply stating, that already, from my experiments, it has been demonstrated, that constriction of the neck of the bladder is produced by the anterior *fasciculi,* and its dilatation by the posterior *fasciculi* of the spinal chord."

" It is also useful here to state, that I do not regard the cerebral lobes as exclusively destined to produce motions of flexion,—but as organs devoted to manifold important operations; nor do I view the *cerebellum* as an organ solely for producing motions of extension, but as one which may direct and regulate other functions; but I merely wish now to establish the principle of the distinct influence exercised by the brain and *cerebellum* over the motions."—(P. 216–217.)

He further adds, that, as it results from the observations already adduced, that spasmodic extension of the whole person, and especially of the neck and head, or, in short, *opisthotonos*, general or partial, is associated with a morbid affection of the *cerebellum*, capable of generating spasm,—it must follow, conversely, that spasmodic extension of the head and neck is an evident symptom that the disease is seated in the *cerebellum.* Spasmodic flexion, on the other hand, or *emprosthotonos*, general or partial, indicates that the disease is seated in the brain.

He cautions the reader, nevertheless, that it is not to be expected, that all the diseases of the cerebral and cerebellic lobes ought to induce derangements in the action of the muscular system; since both organs are liable to morbid states which do not affect the motions of the muscular system: but he maintains the converse, that it will always be true, that, in the case of spasmodic flexion, the disease is seated in the cerebral lobes, and *vice versa*, in the case of spasmodic extension, that it is seated in the *cerebellum.*

From all these facts and considerations, he takes occasion to establish a pathological principle, and a therapeutic rule of some importance and utility. As it is well ascertained that, in diseases of the cerebral or cerebellic lobes, attended with their respective spasmodic motions of spasmodic flexion, or extension, inspection discloses always either congestion or genuine inflammation or its results, not tending, however, to disorganization, it is manifest that spasms of this description, if they be intense and long-continued, are not simply nervous or pure effects of debility, but proceed from irritation given to the parts of the brain specified. Hence he recommends, that the curative method ought to be antiphlogistic or revellent, and directed to remove the chief morbid element, for instance any one of those already referred to.

VI. M. Bellingeri then proceeds to inquire into the state of the motions of the muscular system, when both the brain and the *cerebellum* are simultaneously affected with disease. From six cases, in which both these portions of the nervous system were more or less inflamed, softened, or disorganized, with various concomitant derangements in the motions of the head, trunk, and extremities, he infers, that the cerebral lobes influence more frequently and preferably the thoracic extremities, than the abdominal, especially when the diseases are such as to give rise to spasm. On the contrary, the diseases of the *cerebellum*, if apt to induce spasm, affect for the most part the extensor muscles of the head and neck, producing *opisthotonos*, or affect at the same time, and in an equal degree, the thoracic as well as the abdominal extremities; but if these diseases of the *cerebellum* are adequate to induce palsy, they affect preferably, and in a greater degree, the inferior extremities than the superior.

The different degrees of spasmodic affection induced in diseases of the *cerebellum*, to the extent of partial or general *opisthotonos*, in different cases, M. Bellingeri believes to depend upon the different seats and various extent of the lesions of the *cerebellum*. The cases induced, he thinks, warrant the conclusion, that when the lesion affects the surface of the *cerebellum*, and is limited to the superior and posterior, especially the median surface of the *cerebellum*, it induces only *opisthotonos* of the head and neck; but if the lesion be general and deeper, or affect the inferior surface of the organ, it induces general *opisthotonos*, that is, *opisthotonos* extending to the trunk and extremities. From these facts, he conceives, it results, that the central region of the *cerebellum* influences the motions of extension of the neck and head, while its hemispheres or lateral regions preferably preside over the motions of extension of the extremities; and he further conceives, that *opisthotonos* of the neck and head may be regarded as a symptom indicating the existence of a lesion in the centre of the *cerebellum*, whereas general *opisthotonos* proves that the whole *cerebellum* is affected.

The most remarkable circumstance regarding effects not produced by the influence of the *cerebellum*, and apparently attributable to exclusive affection of the brain,—is, that, with spasmodic or paralytic affections dependent on the latter, there is almost invariably combined cutaneous *anaisthesia*, and that this symptom is never observed conjoined with the same affections, when proceeding from lesion of the *cerebellum*. The author, therefore, concludes, that *anaisthesia* conjoined with palsy or spasm is a characteristic symptom of disease of the cerebral lobes, and an indication that the *cerebellum* is unaffected; and he therefore espouses the views of Flourens on the influence of the cerebral hemispheres on the sense of taste, and professes himself opposed to the opinion of Foville and Pinel Grand-Champ, who endeavoured, by experiments, to trace this faculty to the *cerebellum*.

VII. The fifth proposition enumerated by M. Bellingeri is, that *the anterior strands of the spinal chord, and the anterior roots of the spinal nerves are subservient to the motions of flexion;* and this he studies to demonstrate in the same manner as the former, by anatomico-physiological arguments, by experiments on animals, and by pathological observations on the effects of disease on the human body.

With regard to the experimental proofs, which are the first deserving attention, we find that M. Bellingeri adds to the evidence furnished by his own experiments, as communicated in last Number, that supplied by the experiments of Professor Rolando, and which show, according to the present author, that lesions and sections of the cerebral strands of the spinal chord, and the anterior roots of the spinal nerves, equally annihilate the motions of flexion, without affecting those of extension.—Pp. 253, 254.

On the pathological proofs of this part of his theory, the author has bestowed very great pains, and has adduced from Royer-Collard, Bayle, Rullier, Berard, Boyer, Serres, Velpeau, Ahlberg, and Retzius, Poletti, and Magendie, a series of eleven very interesting cases of more or less affection of the spinal chord, and in which, with disease of the anterior strands and roots, was associated more or less derangement of the motions of flexion,—with various interesting and ingenious comments on these cases, and the morbid appearances disclosed. We regret that our limits permit us not to enter into the detailed consideration of these reasonings; and we must now restrict our notice to the conclusions only deduced by the author.

Bellingeri infers, in the *first* place, from the experiments and pathological facts here adduced, that the morbid affections of the anterior strands of the spinal chord, which are adequate to produce spasm or predominance of nervous action, induce spasmodic flexion, enduring sometimes till death, or even after death, as well in the trunk as in the lower and upper extremities, and in the hands and fingers; and further produce sometimes a spasm in the extremities in the direction of adduction; and that hence we must infer, that these strands and the anterior roots regulate the motions of flexion and adduction in the trunk and extremities; an inference of the same tendency with that relating to the brain and cerebral lobes. It is an anatomical fact, he maintains, that the anterior strands and roots are connected with the cerebral lobes only, or are *cerebral strands* and *roots*; and physiological inquiry shows that both agree in the influence which they exercise over the motions of flexion in the trunk, and flexion and adduction in the extremities.

He then forms a conclusion as to symptomatology and pathology;—viz. that flexion and spasmodic adduction of the extremities depending not upon affection of the brain, but upon that of the spinal chord, indicates that the disease is seated not in the whole spinal chord, but only in the anterior strands, or in the anterior roots of the spinal nerves. This may continue so long as the actions are chiefly spasmodic irritation, either mechanical or physiological, as that from inflammation or its products; and he infers that it is only when palsy has taken place, that we can have reason to believe that there is sufficient pressure to disorganize the structure of the chord.

He further agrees with Magendie and Sir C. Bell in ascribing lesions of motions only, and not of sensation, to these anterior roots; and differs from Rolando, who ascribes to these roots the faculty of presiding over the sense of touch.

VIII. The last proposition enunciated and demonstrated by Bellingeri is,—that *the posterior strands of the spinal chord, and the posterior roots of the spinal nerves, are subservient to the motions of extension.*

Next to the doctrine of Nervous Antagonism, this proposition contains principles by far the most characteristic of any propounded by Bellingeri. It is, it will be remembered, in one important circumstance at variance with the doctrines maintained by Sir Charles Bell, in so far as Bellingeri attributes to the posterior roots not only sensation, but the faculty of regulating motion and the motions of extension, in consequence of his discovering that these roots consist of two sets of filaments,—one a sensiferous, issuing from the posterior peaks of the gray matter of the chord, and the other a motiferous, derived from the posterior strands of the chord. While he takes the preliminary precaution, therefore, of saying that he does not attribute the faculty of motion to the whole of the posterior roots, but only to those which he had shown, proceed from the posterior strands, he makes great efforts to adduce a strong and conclusive body of evidence to prove the justice of the proposition which is so necessary to the support of his theory.

Passing over the anatomico-physiological proofs, as principally considered on a former occasion, we find among the experimental proofs, in addition to those considered in our last Number, several experiments performed by Professor Rolando, adduced in support of the doctrine now specified.

In the first of these, Rolando injured the superior, that is posterior, roots of the spinal chord of a rabbit below the second lumbar *vertebra*, when the hinder extremities were left semiparalytic, and contracted by little and little. Upon increasing the injury, palsy of these extremities was perfect, while the left leg was folded and contracted anteriorly, but immoveably. Hence, therefore, says Bellingeri, the motions of extension were annulled, and those of flexion predominated; and the leg was inflected immoveably anteriorly, because the agents of extension were inert. Upon the inferior, that is, the anterior strands of the cervical region of the chord being injured, the two fore-legs remained unmoved and stretched forwards. Consequently, continues Bellingeri, when the abdominal or cerebral strands of the spinal chord were injured in the neck, the motions of flexion were destroyed, and those of extension predominated.

Two other experiments are less pointed, and, we think, cannot be confidently adduced in support of the present doctrine. In short, whether it be, that this part of the inquiry is really the most difficult in prosecution, and liable to the greatest number of fallacies, we know not; but we must say, after careful consideration of the experiments and arguments adduced by the author, that the deductions are by no means unequivocally and indisputably established.

There is, indeed, one fallacy which the author attempted very diligently to obviate,—that of the exhaustion from hemorrhage in warm-blooded animals, as well as the obstruction to accurate results by means of coagulation of the blood. It will be remembered, that Bellingeri, with the view of obviating these sources of fallacy, performed his second series of experiments on frogs; and we think these experiments are much more conclusive than any in the present volume under this head. These experiments he repeated in the year 1833, in the presence of Professors Mojon, Martini, and Griffa; and all these distinguished persons, he tells us, agreed with him in the exactness and clearness of the results already specified, regarding the motions of extension being annihilated.

The proofs derived from pathological sources consist of six cases of various degrees of disease, chiefly of the posterior surface of the spinal chord, with or without disease of the brain and its membranes, and in which there was more or less tetanic rigidity in the direction of extension of the head, trunk, and extremities. From these cases the following general conclusions are deduced.

1. When the posterior strands of the spinal chord are irritated by any cause, mechanical or physiological, adequate to produce spasm, spasmodic extension of the head, neck, trunk, and upper or lower extremities ensues, of one or more portions of these, according to the different seat of the irritation in the said chords; which hence must be admitted, by means of the posterior roots of the spinal nerves, to preside over the motions of extension of the parts specified, and thereby over those of the entire body; and hence they have the same influence, he argues, as the *cerebellum*. It will be remembered that Bellingeri formerly proposed to distinguish these strands by the appellation of *cerebellic* strands of the spinal chord.

2. It further results that *opisthotonos*, general or partial, proceeding from disease of the spinal chord, indicates that the disease does not affect the whole chord, but only the posterior strands or the posterior roots of the nerves.

3. Irritations, mechanical or physiological, of the posterior strands or the posterior roots in the superior cervical region, is connected with spasmodic extension of the head and neck; irritation, mechanical or physiological, of their strands or roots in the inferior cervical or dorsal region of the chord, is connected with spasmodic extension and rigidity of the trunk and of the arms; and the same states, if confined to the inferior dorsal or lumbar region of the chord, give rise to spasmodic extension of the abdominal extremities.

4. An affection of the spinal chord, giving rise at first to spasmodic extension, must be attributed to irritation, physical or physiological, of the posterior strands, without morbid products sufficient to destroy or compress. When the spasmodic extension is succeeded by palsy, then there is reason to infer that the lesion consists in inflammatory products sufficient to induce intense compression, or in softening, or complete liquefaction and dissolution of the chord. (Case of Melier, No. 68.) Lastly, when the spasmodic extension is succeeded by spasmodic flexion of the same extremities, this phenomenon indicates the destruction of the posterior strands, and successive irritation of the anterior strands of the chord. (Case by Colin, No. 72.)

5. It is further to be observed, that, in all varieties of disease of the posterior strands of the chord, there is more or less change in sensibility, which is either augmented, disordered, impaired, or entirely extinguished. But it is cutaneous and general sensibility that is thus deranged, not muscular; and hence it must result, argues M. Bellingeri, that, when the posterior surface of the spinal chord is diseased, sensibility is affected, either by augmentation or diminution; so that, when sensibility

is thus affected in a spinal complaint, the physician may conclude, that the disease is chiefly seated in the posterior surface of the chord; whereas in a spinal affection, in which the usual symptoms appear without disorder, augmentation, or diminution of sensibility, there will be reason to believe that the anterior surface of the chord is affected.

These form the most essential and important conclusions deduced by the author, without entering into the minute and rather reiterated illustrations which, in his anxiety to expound and enforce his peculiar doctrines, he so often brings forward. We have studied to give them distinctly and explicitly, as laid down by the author himself, without any comment unless what was occasionally requisite to explain obscurities, or rectify apparent errors; and we intended to have reserved to the conclusion any critical observations which we thought requisite to make. We find, however, that the sketch now given has extended to so great a length, that we cannot, without impropriety, attempt to occupy more of our pages with the consideration of a subject which, though both interesting and important, is, nevertheless, too complex to be settled in a manner so brief and cursory, and which, to do it justice, would occupy not much less of our time and space than the account of the present work itself has done.

IX. We have only now to direct attention for a little to some remarks of the author on spasmodic and paralytic symptoms,—partly for illustration of the principles already laid down, and partly because the following remarks flow as deductions from the facts elicited in the course of the inquiry.

Spasmodic affections, of whatever sort they are, he regards as dependent on irritation excited in some part of the nervous system; and this irritation may proceed either from a mechanical cause, or from excess of blood either by stagnation (*stasis*,) or afflux or determination, or genuine inflammation, or any of its products qualified to irritate, yet not to destroy, the texture and nervous action.

Mechanical causes, he observes, if cognizable and removeable, ought to be removed. Of this kind are foreign bodies introduced, depressions, or tumours of the bones.

Stagnation he places in the veins, and determination in the arteries; both being distinct from inflammation, yet sufficient to excite or irritate to such an extent as to disturb the regularity and derange the harmony of the functions of the nervous system. These states are to be opposed by blood-letting, general and local, according to the strength of the patient, revellents, the *douche*, local cold or iced applications and astringents.

The essence of spasm, he further thinks, may consist in a genuine inflammatory disorder, acute or chronic, with or without fever, and with the usual concomitants; and this state requires the energetic use of the general and local antiphlogistic method of treatment.

He further observes, that when either simple irritation or inflammation attacks any point of the nervous system, they evince this peculiarity, that they augment greatly the properties of this system; whence there is either extreme sensibility, and pains like neuritic pains are induced; or excessive muscular contractility and frightful spasms, as in the various species of tetanus, ensue. Under such circumstances, he regards the depletory method as alone inadequate, and he recommends that its influence should be seconded by the administration of the class of remedies denominated Nervine and Sedative, or those which have the power of abating and even exhausting the powers of the nervous system. Of this kind, he thinks, are prussic acid, cherry-laurel water, the extracts of henbane, hemlock, nightshade, stramonium, &c. As to opium, he recommends the acetate of morphia either externally, or preferably by the endermic method,—after suitable depletion.

He then adverts to the spasms produced by any of the products of inflammation; for instance, thickening or adhesion of the membranes, induration or softening of the nervous substance, and its other degenerations. The existence of one or other of these results may be anticipated by the long duration of the disease; and though there are no clear or unequivocal signs to denote which of these, or whether any has taken place, this is of less moment to the clinical practitioner, since all the remedies which are conceived to be beneficial are analogous. In such circumstances, those recommended are mercurials, preparations of iodine, internally and externally, sulphurous waters, cauteries, setons, and the *douche.*

He admits, nevertheless, that spasmodic affections do not in all cases depend on the presence of causes so serious; and he excepts from this class those wandering transitory spasms, which are easily excited, and easily disappear, and return upon the operation of mental causes, and which are chiefly connected with the hysterical, hypochondriac, or nervous temperament.

On the pathology and treatment of palsy we perceive nothing new.

We now conclude this article; and, with this, must leave for a time M. Bellingeri. We cannot do so without saying, that, though we do not adopt several of his inferences regarding the influence of particular parts of the nervous system on the motions of flexion and extension, adduction and abduction, we think he has great merit in cultivating this department of inquiry; in unfolding the peculiar views which he has given upon the relations, we would term it, which subsist between the central portions of the nervous system and the ramified nerves, and those muscular organs to which they are distributed; and in applying to illustrate these views, the experiments and observations of so many authors. These views may not only serve as a basis for future observations and inquiries, which may then be received as the test of the justice of the opinions now promulgated; but they may suggest to others new investigations, which may at length terminate in the formation of a more accurate and correct system of doctrines on the functions of the nervous system.

The great defect in the theory of M. Bellingeri, and, indeed, in all theories hitherto proposed, is the assumption, that an influence is generated in the central portions of the nervous system, and is thence propagated to the extremities of its ramified portions. This assumption is altogether gratuitous and unnecessary, in many instances at variance with the phenomena, and in all a very great incumbrance, and a gross, clumsy, and mechanical invention. There is no reason to believe that any thing is generated in the brain or spinal chord; and as little reason to believe, that it is transported or conveyed by the nerves to the remote organs, like the rude fancy of *chordae internunciae* by John Hunter. All that the nerves can do is, to maintain a communication between different parts of the organized frame,—to keep these parts in harmony of action with each other and with the whole,—and to exercise a general moderating or regulating control over the inherent properties peculiar to each organ. It may be stated as equally certain, that the nerves do not furnish the muscles with contractility, as has been most absurdly and unwarrantably taught by some, in opposition to, and disregard of, the facts ascertained by Haller, but that they merely regulate the irritability of the muscular organs in such a manner as to produce regular, harmonious, and uniform voluntary or involuntary motion.

The doctrine of Nervous Antagonism, though the most ingenious, and perhaps the most studiously elaborated by Bellingeri, is nevertheless the one most defective in its proofs and illustrations. We believe that it is so from the inherent difficulties, and natural obscurity of the subject; and we do not urge it as a discredit to the author, that he has not been very successful, where he has been almost the first, and where, in all probability, all others would have failed. He is, on the contrary, entitled to the thanks of the physiological world, for the diligence, the perseverance, and the ingenuity with which he has explored, defended, and illustrated this subject; and it is quite clear, that none but an enthusiast like Bellingeri, and an ingenious and acute enthusiast too, could have made, by any means, so good and strong a case for the doctrines which he propounds and espouses.

Art. II.—*Cathétérisme Rectiligne, &c. Rectilinear Catheterism, or a new method of practising this operation on the Male, &c. with an operation peculiar to the Author, for the cure of Strictures in the Urethra; followed by a new method of reuniting and cicatrizing Lacerations of the Vagina and Perinæum, produced by Delivery.* By Et. Moulin, D. M. P., &c. Paris. 8vo. Pp. ii. and 184. Ten Plates.

This work, part of the title-page of which we have quoted above, contains much that is to be found in every book professing to treat of surgery, and, with the exception of those parts, the substance of which we shall now lay before the reader, there is not a single observation which is not to be met with in Mr Samuel Cooper's Dictionary.

M. Moulin does not claim for himself the merit of being the first to use the straight catheter, since, from specimens discovered in Herculaneum and Pompeii, and the designs left by Albucasis, the ancients as well as the Arabians seem to have occasionally availed themselves of this form of the instrument. In modern times Rameau, 1729,—Lieutaud, some years before 1776, —the authors of the Dictionnaire de Medecine and de Chirurgie, 1772,—Santarelli, of Rome, 1795,—Lassus, about the same time,—and Montaigre in his Inaugural Thesis 1812, have more or less recommended the straight catheter. Of all this M. Moulin declares himself to have been ignorant, when he first thought of employing the straight form of the instrument, and, besides, none of the authors cited recommended the position in which he places the patient, and upon which the facility and success of the operation so much depends.

In 1820, at the request of the author, who was then confined by indisposition, an extract of the present work was read by M. Pavet to the Medical Society of the Dispensaries. Urged by several of his brethren, M. Moulin announced the present work in 1821, but was prevented by his other avocations from publishing it till 1828. In the meantime his plan had been put to the test of experience by several surgeons of eminence, as Amussat, Larrey, Civiale, Lisfranc, Cloquet, Fournier. With British surgeons, however, the straight catheter has never been a favourite.

The obstacles which are usually met with in introducing a catheter into the bladder are referred by M. Moulin to four heads. The first are natural or organic, and frequently owing to the age of the patient; the second are observed in certain morbid states when the canal is free; the third depend on a spasmodic and generally transient obstruction of the urethra; the fourth and most numerous are owing to strictures. To the consideration of these different obstacles the author devotes sixty pages, in which he sets forth at length all the difficulties and inconveniences, real and imaginary, which attend the usual mode of introducing a catheter of the ordinary form, and the various manœuvres and modifications of the instrument contrived to overcome these difficulties, for each and all of which he believes himself to have discovered a simple and most effectual remedy.

When the obliteration of the canal of the urethra is complete, or so nearly so that the finest sound cannot be passed, and the urine comes away in the smallest stream, he introduces down to stricture, a bougie with its end covered with ointment, and causes it to penetrate farther every day. The sound is not had recourse to till the bougies have, by inducing suppuration, destroyed the obstacle, and a month is often spent in effecting this.

When the stricture is not so considerable, and a very fine and conical sound, without being able to reach the bladder, may nevertheless enter and clear the stricture, M. Moulin has recourse to forced injections.

The merit of introducing the practice of forced injections has been claimed by MM. Fournier and Amussat. M. Fournier's plan was to carry a straight catheter along the urethra to the stricture, and fix it there. A ribbon was then rolled round the penis, from the place corresponding to the stricture, as far as the glans, and drawn tight enough to cause the interval between the catheter and the parietes of the urethra to disappear. This being done, oil, water, or, if the stricture was complete, mercury, to the amount of half a pound or a pound was injected into the instrument. According to M. Fournier, the injected liquid, especially if it be mercury, escaping forcibly from the eyes of the catheter, insinuates itself between it and the parietes of the urethra, and so far dilates the canal. By proceeding thus, M. Fournier asserts that he has reached the bladder.

To this plan M. Moulin offers some objections, which appear to be well founded. If the stricture be not complete, the injected liquid must at once reach the bladder without gaining any advantage; and it is not easy to say what might be the consequence of introducing half a pound or a pound of mercury into that *viscus*. On the other hand, if the *urethra* be completely closed, its parietes cannot resist the force of the injected liquid, and must necessarily be torn. Thus, so far from remedying the evil, it makes matters worse. The form of the instrument, too, terminating as it does in a bulb, causes it to advance with difficulty in the *urethra*, and be altogether stopped when it reaches the stricture.

M. Moulin's plan is not liable to any of these objections. His apparatus is composed of a hollow sound, closed at its vesical extremity without eyes, and of a conical form, more or less slender towards its termination, of greater or less dimensions, according to the narrowness of the stricture, the presumed diameter of the canal, the degree of dilatation desired, and the depth at which the stricture exists. The sound is a soft gum elastic case, very thin and extensible, and destined to lodge a wire which ought to fit it exactly, without which it would have no solidity. To the thick extremity of this sound, that is to say, its mouth, a small box or nozzle of silver or copper, of a conical form, is fitted. This being larger than the sound towards its middle, grows narrower, and terminates in an opening of the same diameter as the instrument. The enlarged portion of this presents on its sides two indentations opposite to each other, in which is lodged a thin plate of the same metal as the rest, corresponding in size to the canal of the sound, which it will shut or open according as it is pushed forward or withdrawn. On both extremities of this plate there is an eyelet; that of the one side serving to fix it when shut, that of the other to open it. By these, also, the instrument is fixed in the *urethra.* The rest of the apparatus consists of a syringe like that of Anel, the tube of which is exactly fitted to the mouth of the sound when the wire is withdrawn.

The mode of using this apparatus is very simple. M. Moulin introduces the sound, armed with its wire, and makes it turn between his fingers as he advances it. In general, it is easy to make its point clear the stricture, and this ought, if possible, always to be done. The wire being then withdrawn, and the small syringe charged with mercury being attached, the liquid is injected, little by little, till a quantity be introduced sufficient to distend the instrument. The plate is then pushed in, the syringe withdrawn, and the instrument fixed in the usual manner. The operation ought always to take place after the patient has made water, or when little urine is in the bladder, in order that the sound may be retained the longer in the *urethra.* When it is to be withdrawn, as it must be at least three times in the twenty-four hours, it is sufficient to open the plate and allow the mercury to escape, when it may be easily removed. Immediately after the patient has made water, it is again to be introduced and filled as before.

One injection, if the distended sound be left in the *urethra* two or three hours, is often sufficient to dilate the *urethra* so much, as at once to permit the passage of a gum-elastic sound of a sufficient calibre, after which the dilatation may be carried to the utmost extent desirable.

This operation, according to M. Moulin, besides being free from all the objections applicable to the plan of MM. Fournier and Amussat is simple, easy of execution, causes little pain to the patient, and is destitute of all danger. He has had occasion to employ it in two cases only, but in both it was successful. He candidly confesses, however, that when the stricture is such that a bougie of the lowest number cannot be passed, and especially if the canal be obliterated at any point, bougies ought to be preferred to the forced injections, though the latter, perhaps, might be rendered useful.

In introducing the straight catheter, M. Moulin lays great stress on the position in which the patient is placed, and gives minute directions for the different postures required in different circumstances. The principle of one and all is, that the thighs be widely separated, and the body bent forwards.

For the introduction of the instrument, M. Moulin gives the following directions. The patient being properly placed, the surgeon, with the left hand in supination, takes the *penis* by its sides, to avoid compressing the *urethra* behind the *glans*, and draws it forcibly to him in a horizontal direction, to efface the wrinkles and folds of the mucous membrane, and render the *urethra* perfectly straight. Then with the right hand in demi-pronation, holding like a pen, a silver or gum-elastic catheter of the proper length and size, and besmeared with some fatty or oily matter, he introduces it into the *urethra*, causing it to turn between his fingers, to facilitate its passage, and pushes it gently and gradually from before backwards, in a horizontal direction, till it reach the arch of the *pubis*. Arrived at this point he draws the *penis* more and more on the instrument, and, gradually depresses them both till they become perpendicular, taking care, however, not to curve the penis backwards on the *perineum*, at the same time that he recommends the patient to bend farther forwards. The object of this is to place the *urethra* on the same line with the orifice of the bladder, and to cause the point of the bougie, directed higher and higher, to traverse more easily the bulb as well as the membranous and prostatic portions of the *urethra*, clear the neck of the bladder, and reach the interior, to accomplish which, however, the surgeon is sometimes obliged to raise in the slightest degree the extremity of this bougie and the *penis*, especially when the *rectum* is filled with feces. In some cases it might be useful to empty the *rectum* by means of an injection, for the purpose of effacing the slight curvature formed by the *urethra* on the *pelvis* when the intestine is full.

During the progress of the catheter, care must always be taken to cause the point to proceed along the pubic surface of the *urethra*, as well to avoid the false passages which may have been formed on the perineal surface by preceding introductions of the curved catheter, as to prevent the instrument from entangling itself in the *lacunæ* which are found on the sides of the urethral crest, and towards the bulb. This precaution is particularly necessary when the prostate is diseased and enlarged. When the catheter has been thus introduced, the wire is to be withdrawn if the instrument be gum-elastic, and the bladder completely emptied, by gradually raising the orifice of the instrument, to plunge its point to the bottom of this viscus, to evacuate the last drops of urine, or, if necessary, to ascertain the presence of a calculus.

Rectilinear catheterism, practised with the precautions just mentioned, presents, according to M. Moulin, so few difficulties that the patient may soon learn to perform it easily himself, provided the *urethra* be clear. For this purpose he takes his *penis* in his left hand in a state of supination, holds it first in a horizontal direction, but soon inclines it towards the ground, at the same time that he gradually bends himself forward, and introduces with the other hand in demi-pronation the catheter, which he makes proceed rather by drawing the focus on it than by pushing the instrument onwards.

If the catheter is to be left in the bladder, care must be taken that it be not too long, in order that the internal surface of the posterior part of the viscus may not suffer from the friction consequent on the different motions of the patient, and that the *penis* may be left free to rest on the thigh, which is of consequence when the patient has to move about. This advantage cannot be secured when the catheter is curved, from the elevation of the *penis* fatiguing the patient, and giving the catheter that direction which causes its point continually to rub against and irritate the parietes of the bladder.

To stop the mouth of the catheter M. Moulin has invented several kinds of plugs, for which, as it would not be easy to convey a notion of these to the reader without the aid of figures, we must refer to the work itself. His mode of fixing the instrument is the same as that now in use on the continent, which being described in several works in daily use, (Cooper's Surgical Dictionary p. 352, 6th edition, and Averill's Operative Surgery, p. 105,) it is unnecessary to detail here.

After giving several directions for what is to be done on various occasions of difficulty, the author details sixteen cases in illustration and support of his views, which, though narrated, perhaps, with too great minuteness, appear to corroborate his statements.

Having thus described the cases requiring the employment of the catheter, reviewed the various modes of performing the operations, as well as the various modifications of the instrument, and explained his plan for overcoming the various difficulties incident to the operation, M. Moulin sums up the whole under seven heads.

1. When the canal of the *urethra* is of its natural dimensions, and free from every obstacle, a straight or curved catheter may be used indifferently, since the *penis* is flexible and follows the curvature of the latter instrument.

2. But rectilinear catheterism is far preferable to the old plan when, from the mucous membrane being relaxed and its subjacent cellular tissue infiltrated, the progress of curved catheters is stopped by folds, while straight sounds introduced according to the author's plan, so well and so easily efface them.

3. The employment of straight catheters in the author's manner is preferable to curved sounds when the bladder is enormously distended, or when there is great obesity.

4. Rectilinear catheterism is more easy than the ordinary plan in strictures of the *urethra*, the morbid disorders which produce them having their seat and origin more paticularly on the perineal wall of the urinary canal, and thus straight sounds, which glide along the superior wall more easily, avoid these obstacles.

5. Straight sounds detect a calculus or other uretro-vesical disorders better than crooked sounds.

6. They are also more easily fixed in the bladder, and less troublesome than the latter.

7. In fine, rectilinear catheterism is preferable, and even the only plan, according to M. Moulin, of reaching the bladder when the walls of the *urethra* have been torn and false passages formed by curved sounds, or when there is fistula of the *urethra*.

On considering all that M. Moulin has brought forward in support of his favourite instruments, it does not appear to us that they obviate any of the difficulties attending the present mode of performing the operation, except when the mucous membrane is much relaxed, the frequency and extent of which relaxation, we think, he has rather exaggerated. In his plan of dilating strictures by forced injections, we see more ingenuity than usefulness; for we cannot conceive why a solid bougie introduced into a stricture should not cause absorption as rapidly at least as a hollow one filled with mercury. In laying before the reader, however, this account of a book which has created some little sensation on the continent, we have fulfilled a task which we ought long ago to have executed, had not our attention been claimed by numerous works, both British and continental, of greater interest and greater utility.

Of the author's new plan of reuniting and curing lacerations of the *vulva* and *perineum*, we shall merely remark, that it consists of an instrument formed of two broad blades, united like the blades of a pair of forceps, lined with leather, and furnished with a sliding bar, which opens or shuts them at pleasure. By these the two edges of the laceration are kept in juxtaposition, till union takes place. M. Moulin allows that the instrument would be useless if the lacerations were of considerable extent; and we suspect that in other cases it will be found more ingenious, than useful or necessary.

ART. III.—*Du procédé opératoire, a suivre dans l'exploration des organes par la percussion mediate, &c.—Of the Operative process to be followed in the examination of Organs by Mediate Percussion; and a collection of Memoirs on Physiology, Pathology, and Diagnosis.* By P. A. PIORRY, D. M. P. Fellow of the Faculty of Medicine, Professor of Physiology and Medicine, &c. Paris and London, 1830. 8vo. Pp. 431.

THE work before us consists of two distinct parts, each of which merits a separate examination. The first, extending to 206 pages, contains M. Dumeril's report to the Academy of Sciences on mediate percussion,—an introduction,—a description of the *plessimeter*,—an account of the sounds furnished by that instrument, and of the sensations communicated to the finger employed in percussion,—directions for using the instrument, and the application of these to the examination of the state of the thoracic and abdominal viscera. The second part consists of three papers on the circulation,—three on respiration,—two on the digestive organs,—and one on a species of *hemicrania.* The second part we shall take another opportunity of noticing. In the meantime we confine our attention to the first.

Avenbrugger, a physician of Vienna, was the first to employ rapid percussion with the hand or tips of the fingers on the *thorax*, as a means of discovering and distinguishing various affections of the organs contained in that cavity. His pamphlet, entitled *Inventum novum ex Percussione Thoracis Humani, &c.*, first printed at Vienna in 1761, was translated into French by M. Roziere de la Chassagne in 1770. This translator endeavoured to deprive Avenbrugger of the merit of the invention, by quoting a passage of the prognostics of Hippocrates, from which he inferred that the Coan sage made use of similar means to ascertain the state of the *thorax.* In a note, however, he admits that Hippocrates employed *succussion* and not *percussion*, and that his plan was to take the patient under the arms and shake him,—a proceeding very different from that recommended by Avenbrugger, imparting but limited information, and that in very few cases. The original and the translation, however, were both forgotten, till Corvisart, in 1808, republished the former, with a preface, translation, and commentary, in the first of which he repelled M. Roziere de la Chassagne's attempt to deprive the author of the merit of his invention. For an account of this edition, we must refer our readers to a paper in the seventh volume of this Journal. Till Laennec's plan of mediate auscultation came into use, Avenbrugger's plan continued to be the favourite mode of examining the chest, and even yet among the older physicians, it has not been superseded by the stethoscope.

In 1828 M. Piorry published a treatise on mediate percussion, which, in 1829, was rewarded with the Montyon prize by the Academy of Sciences. The instrument recommended in this work consisted of a thin plate of wood or ivory, which, being placed between the integuments and the fingers, emits on percussion sounds varying according to the situation in which it is placed, and the state of the subjacent organs. To this instrument he has given the name *plessimeter*, from two Greek words πλήσσω, I strike, and μέτρον, a measure. From the appearance of this first treatise, to the publication of the present volume, M. Piorry continued his researches and experiments, the results of which he has taken this opportunity of making public.

We pass over the report of M. Dumeril to the Academy, the introduction, and the section devoted to the consideration of the various forms of the instrument adopted by M. Piorry and others, and proceed to the consideration of the sounds furnished by the *plessimeter*, and the sensations experienced by the finger during percussion. For a long time M. Piorry thought that the sounds emitted by the *plessimeter*, were of themselves sufficient to enable him to form a diagnosis, and he was surprised to find the bystanders unable to mark that resonance which he distinguished so well, and which the *post mortem* examination demonstrated to be always connected with the state of the subjacent organs. At first he imagined that this was owing to his greater acquaintance with the subject; but he afterwards discovered that he had been confounding two things essentially distinct, the sound heard by the ear, and the sensation of resistance communicated to the finger tapping on the *plessimeter*. Having ascertained this fact, he soon discovered that it enabled him to judge not only of the density of the organs over which the instrument was immediately placed, or of that of parts separated from the plate by solid tissues, but also of the degree of the density of the parts, even where elastic fluids were interposed between them and the *plessimeter*. Thus the finger has a distinct sensation of the density of the skin which it mediately strikes, recognizes that of the liver covered by the integuments and ribs, and judges, besides, of the hardness of that organ, though it be separated from the costal parietes by the lung filled with air.

M. Piorry has abandoned the terms which he used in his first publication, to express the various sounds produced by the *plessimeter*, because they were occasionally susceptible of false interpretations, and increased, besides, the difficulties of the student.

Finding that sounds analogous to those furnished by mediate percussion could be reproduced only in an imperfect manner in known substances, and the difficulty being increased by the necessity of expressing at the same time the sounds affecting the ear, and the sensations experienced by the finger on percussion, M. Piorry has contented himself with pointing out the means of reproducing at pleasure the principal results of mediate percussion.

The percussion of the *plessimeter*, well fixed over the frontal bone, produces the sound to which he has given the name *osteal*, and the highest degree of resistance which the finger can experience.

The percussion of the *plessimeter*, applied over the fleshy part of the thigh, produces a double sensation of hearing and touch, which represents the sound and density of the left ventricle of the heart. The points of the liver in contact with the parietes, and not covered by lung, and those where there is much thickness, give rise to more heaviness and hardness than is offered by the thigh when struck.

The sound and elasticity of lung are easily ascertained by percussion of the *plessimeter* applied over the chest, at an equal distance between the nipple and the clavicle.

If an empty glass held in the hand be covered with a *plessimeter*, and surrounded by the finger and thumb, and that instrument be struck, the sound which is emitted, and the elasticity perceived by the finger, resemble those furnished by percussion of the stomach or cœcum. The capacity of the glass determines the nature of the sound produced, and all the shades of tympanic resonance may be imitated by varying the extent of the cavity of the recipient, by the addition of a greater or less quantity of liquid. If the glass is in a great measure filled, the sound obtained will resemble that furnished by the colon.

If the air be permitted to escape by a lateral opening produced between fingers and the margin of the glass, and percussion be made, a sound will be heard similar to that to which he has given the name of humoric resonance.

The size of the opening must be in proportion to that of the glass. By the addition of various quantities of water, different degrees of capacity may be obtained, and an imitation produced of the humoric sound combined with different varieties of tympanic resonance. The first of these sounds may also be produced by striking on the knee with the hands united and containing air.

It follows from these last facts, that it is not always water in contact with a gas which produces the *humoric* murmur, but that it may be occasioned by air passing out of a spacious cavity by a narrow aperture. The discovery of this last fact, though claimed by Reynaud, undoubtedly belongs to M. Piorry, who stated it in his treatise of 1828.

M. Piorry retains the word *humoric* though incorrect, because it is in general use, and as the expression *metallic* tingling employed by M. Martinet to designate the sound emitted by caverns on percussion is still more generally known, he makes use of it when treating of the peculiar resonance produced on certain occasions in the chests of phthisical patients.

If a repeater be held in such a position that its case rests on the palm of the left hand, and if its glass be lightly struck with the fingers of the right, a sensation of vibration will be produced by the oscillations of the bell, which is exactly the impression received from the percussion of numerous hydatids contained in a common cyst. A proper idea of the same may also be obtained by striking on animal jelly of a fine consistence.

After the publication of M. Piorry's work, M. Briançon made some experiments on the tremulous sensation produced by hydatids when struck, which he made the subject of his Thesis at Paris in 1828. He first ascertained that an acephalocyst agitated by the hand produced a very distinct trembling, which endured for some seconds. M. Tarral and the author ascertained this also. To the latter the oscillations seemed to depend upon the parietes of these small cysts, the liquid contributing to it only by retaining these little elastic pouches in a state of moderate tension.

The tremulous motion is perceived in acephalocyst cysts either by percussion or auscultation. The oscillations are far from being of the same degree in all cysts and in all cases. M. Briançon took an ordinary bladder and filled it with entire acephalocysts of different sizes, adding a sufficient quantity of water to fill the intervals left between them. Upon striking the bladder he felt most distinctly the hydatid trembling. If he increased the quantity of the acephalocysts, and added an equal quantity of water, the vibrations were less sensible, and they diminished in proportion to the quantity of water added. When there were only one or two hydatids in a large quantity of water, the trembling ceased to be felt. On filling the bladder completely with hydatids without adding any liquid, the sensation communicated was much more distinct than when water was added. From all this it would appear that cysts filled with hydatids are so much the more easily recognized by the aid of the trembling sensation which they communicate, because the quantity of the acephalocysts is proportionally more considerable than the liquid in which they are plunged; that to produce the greatest intensity of trembling, it is necessary that there should be a little water in the cyst, and that, if the proportion of the fluid be increased to a great extent, the diagnosis becomes impossible. In illustration of these positions, three cases are narrated.

The examination of a large artery may also be made by the interposition of a thin solid substance between the finger and the vessel, of which M. Piorry gives an example.

For the rules to be followed in the employment of mediate percussion, and the best mode of studying the subject, M. Piorry refers the reader to his former treatise, contenting himself in his present work with making some observations of practical importance.

In whatever position the patient may be placed, the muscles over which the plessimeter is applied ought to be relaxed as much as possible, because a contracted muscle communicates to the finger on percussion a sense of hardness which is not perceptible when it is in a state of relaxation. This precaution is especially necessary in examining the *abdomen*.

It is not necessary to apply the plessimeter immediately to the skin. Pieces of linen and flannel may be interposed between them, provided they be on all points of the same thickness, and be rendered quite tense. In no case ought mediate percussion to be made over a woollen shirt knitted with large meshes, because, from the air which it contains, it gives a very clear tympanic sound.

If an ivory or metallic plessimeter be applied to the bare skin, it ought to be previously warmed, and the surface of the instrument on which percussion is made ought to be thoroughly dry, because if it be moist the finger will slip and produce little sound.

Almost all the certainty of the results of mediate percussion depends on the mode of applying the instrument. The manner in which the left hand holds it is perhaps more important than that in which the fingers of the right hand strike it. The plessimeter must be held between the thumb and index finger of the left hand, with sufficient exactness and force to prevent it from shaking, and this precaution ought to be taken even when percussion is to be made with the greatest lightness, for it is precisely because one hand must act with vigour while the other ought scarcely to touch it, that such difficulty is experienced in performing an action apparently so simple.

That the plessimeter may be better taken hold of, it will be advantageous to have the diameter corresponding to the points by which it is held, filed flat, because a plane surface comes more extensively in contact with the finger than a convex one, and can consequently be better fixed.

The fixing of the instrument, however, is of little consequence, if it be not applied exactly over the part to be examined; for if air penetrate between it and the skin, a tympanic sound or metallic resonance will be the result. This must be particularly attended to, when it is necessary to depress the integuments, muscles, or viscera to reach deep-seated parts, and more force must then be applied to fix the instrument and surmount the elasticity of the depressed parts.

When it is necessary that a considerable sound be obtained from the organ, the fingers employed in percussion ought to be held in the following manner: The index and middle fingers ought to be applied exactly one above another, the middle one being a little more flexed on account of its greater length, in order that its extremity may not pass that of the index finger. The thumb is then forcibly applied against the articulation of the second and third phalanges of the index. These three fingers thus united constitute a very solid mass, the percussion surface of which, if the middle finger be bent a little more, has only the extent of the pulp of the index; but if the two fingers be placed on the same level, will be of the same dimensions as the united extremities of the two fingers.

The stronger the degree of percussion required, the more firmly must the instrument be fixed.

Though the blow ought to be short and rapid when the sound given by the organs is to be ascertained, and the vibrations rendered as extensive as possible, yet when the object is to discover the density of the tissues, the fingers ought not to be withdrawn immediately on the percussion being made, but be kept applied a little longer when the sensation of hardness or elasticity will be much more perfect. The same is the case in ascertaining the hydatic trembling. As to the humoric sound, it is sometimes useful to prolong it, and, at the moment of percussion, to draw the finger lightly over the plate of ivory, imitating the action of a bow on the cord of a violin.

These directions being given, M. Piorry proceeds to point out what appears to him to be the best mode of studying mediate percussion.

After tying the *trachea* of a subject, to prevent the passage of the air from the lungs, the anterior part of the parietes of the chest and *abdomen* ought to be raised in such a manner that, with little difference, the *viscera* occupy the same place which they did before the opening. The lateral *parietes* of the chest or *abdomen* are sufficient to keep the organs in their place. After wiping the fingers and the plessimeter, let percussion be performed on each part in the place which it occupies, when the various sounds peculiar to each part, in different circumstances, will be readily recognized.

It would be impossible within the ordinary limits of an article to give an adequate notion of the remaining portion of the treatise, which consists of the application of the author's rules and doctrines, to the examination of the various states of the *thorax*, *abdomen*, and their contents. Nothing almost short of a verbatim transcript would answer the purpose, and those who wish to obtain such a knowledge of the plessimeter as may enable them to judge practically of its utility, will require to peruse attentively again and again the portion of M. Piorry's work to which we allude.

We conclude this short notice, by observing, that the chief objections to mediate percussion are the uncertainty of the results which it gives when taken by itself; the difficulty of attaining the necessary tact and quickness of perception necessary to distinguish the various sounds communicated to the ear, and the various sensations to the finger; and lastly, the uneasiness it causes the patient when he hears the sounds emitted by one side of his chest differ from those of the other. Notwithstanding these objections, we consider it preferable to the old method of immediate percussion, and highly useful as a supplementary means of information when the results furnished by the stethoscope are doubtful or unsatisfactory.

ART. IV.—*Physiologie Végétale, ou exposition des Forces et des Fonctions vitales des Végétaux.—Vegetable Physiology; or an exposition of the Vital Forces and Functions of Vegetables.* By M. AUG. PYR. DE CANDOLLE. 3 Vols. 8vo. Paris, 1832.

BOTANY, considered in its relation to the classification of the vegetable kingdom, and the characters by which one plant may be distinguished from another, has a large number of zealous and successful cultivators; and forms a useful, liberal, and healthful study and recreation. When, however, we view its endless bearings on the other kingdoms of nature, and enter into the nicer considerations of vegetable structure and function, and the mode in which production, growth, and decay, are carried on, this branch of Natural History assumes still higher importance among the sciences; and connects itself intimately with many of the most interesting series of natural phenomena, continually going on in the universe.

No one has contributed more to elevate botanical inquiries than the author of the work before us, who has long filled the chair of botany in the University of Geneva; and we think it may be acceptable to our readers, to have a general view presented to them, of one of the most extensive and important treatises which has yet appeared in an interesting collateral branch of medical science.

The connection of animal and vegetable physiology is intimate. Both of them concern functions in which vital powers are concerned; and both afford interesting proofs and examples of that admirable adaptation to important purposes, which is everywhere so apparent in the creation.

The *Physiologie Végétale* forms the second part of a system of botany, in which the author has been long engaged.

The first part of the work related to the internal and external organs of plants; and the present will be followed by treatises on the classification of plants, and on geographical, fossil, and historical botany; with an application of the principles of the science to agriculture, medicine, and the arts.

Physiological inquiries demand, more than any others, a rare diversity of acquirements for their successful cultivation; a circumstance which forms, as the author very appropriately remarks, at once their charm and their difficulty.

Of the former, he has a lively and animating perception; for such species of pursuits have occupied much of his attention from an early period of life. The difficulties attendant on them he does not hesitate to avow, notwithstanding the horror which is so often entertained at a state of indecision, and the general propensity which there is, in obscure subjects, rather to adopt hasty and ill-considered hypotheses, than to admit the existence of any imperfection in the state of human knowledge. But he employs the most effectual means of overcoming difficulties, by directing against them a great variety and extent of attainments, united with industry, discrimination, and candour.

The author divides his work into five parts. In the *first*, he considers vegetable life in general;—in the *second*, the application of vegetable life to nutrition;—in the *third*, the application of vegetable life to reproduction;—in the *fourth*, the general phenomena of vegetation common to both classes of functions;—and in the *fifth*, the action of external agents on the vegetable world.

We shall first, therefore, give a general sketch of the author's views on the subject of *vegetable life*. Between animal and vegetable life there is much analogy. Neither is generated, but both are derived from that great source which originally made, and which, by certain admirable laws and provisions, has perpetuated the objects of creation. The author, indeed, while he avoids useless and unprofitable speculations on the subject, asks, " whether life results from the form of beings, or the form of beings from life ?" as if this could be a matter of rational doubt or hesitation. But while he thus touches on somewhat suspicious ground, he points out, in an interesting and instructive manner, the various bearings of vitality on animal and vegetable functions. In many respects, he shows that animal physiology is more advanced than vegetable; but the latter he considers as having in some particulars made a greater progress than the former, inasmuch as the chemical agents connected with vegetable nutrition are less complicated than those which attach to the same function in animals. The operation of external powers is likewise more distinct; and the faculty of conducting experiments far less limited than where sensation may modify results, and render difficult and repulsive the modes of obtaining them.

Vegetable tissue bears a considerable analogy to the cellular membrane of animals. It forms a sort of frame or net-work, in which are deposited the various matters, whether solid or fluid, of which the mass of the individual consists. These, however, though they impart all the sensible qualities by which the substance is distinguished, may be considered as in some degree foreign or extrinsic, just as is the deposit of the earthy molecules of bones in the cells which are destined for their reception. The constant admixture of other substances with cellular tissue tends to prevent the intimate nature of the latter from being readily appreciable; and the knowledge of this substance is therefore confined to a very few characters.

Extensibility and *elasticity* are two important properties of vegetable tissue. The former is most distinct, where the network is least loaded with foreign deposit. It is limited in its extent; and hence additions of solid materials require an augmentation of the means of receiving them, by the formation of new tubes and new cells. This is strikingly different from the provisions of the animal body, where nutrition and growth go hand in hand; and where the absorbent vessels, on the one hand, and the organs of secretion on the other, produce a simultaneous augmentation of every minute part, so as to adapt it for all the series of changes which are continually going on in the animal economy.

Extensibility is, in a considerable degree, an attribute of life, and this, as well as *elasticity*, disappears on many instances by death. Nature has availed herself of the latter power, in cases where a sudden jirk is required. Thus the stamens of the pellitory are kept down till the flower has advanced to a certain state of forwardness. Then their filaments become suddenly unbent; and the anthers being shaken, throw out their pollen by the elastic motion. The elasticity of the filaments is entirely lost, in consequence of this operation; they droop and wither. But it sometimes happens that there is no elasticity whatever in certain parts of plants, as in the peduncles of the *Dracocephalum Moldavicum*, called likewise *Catalepticum*, because they take any position which may be given to them, just like the limbs of a cataleptic person.

Hygroscopicity, or the power of attracting moisture, is also a property of vegetable matter; but this is not altogether vital; for it exists in many instances, as in hard-wood, just as much after the death of the plant as before it. It can hardly be regarded as dependent on capillary attraction; for it is found where there is no trace of pore or opening; but it is subservient to useful purposes; for the swelling of the woody trunk, by an absorption of water, presses on the bark, and thus squeezes out the gummy or resinous matter contained in it.

In considering the vital properties of vegetables, the author examines the analogy between animal and vegetable *excitability* and *irritability*.

Excitability he regards as an agreeably necessary property of living vegetable and animal matter.

> " That the tissue of plants," he remarks, " is endowed, during life, with a property analogous to that which we term excitability, is what he considers it impossible to doubt: this tissue, exposed to the influence of external agents during life, resists the solvent power of water more effectually than when dead. It bears the action of air, heat, and light very differently in the one state than the other. There is, therefore, a particular force, independent of the form, and the material nature of tissue, to which those differences are to be referred. A great number of the general phenomena common to all vegetables concur in preserving these differences; and cannot be explained without the admission of vital excitability. The sap mounts with energy in living vegetables; and its ascent cannot be compared with the slow and gradual imbibition of water in the same tissue, deprived of life. Light has a great influence, both on the ascent of sap, and on the quantity of water exhaled by living leaves, while it seems to have none on the same organs deprived of life; through the medium of light living leaves decompose carbonic acid gas; but dead ones have no such action. The chemical changes which take place during life in vegetable tissue are very different from those produced by means of external agents on dead vegetables, and sometimes entirely oppo-

site. Developement in length and width; the orgasm which precedes fecundation itself; the recal of the active life of the embryo suspended in the grain; are all so many phenomena which we cannot connect with causes purely physical, and which, partly from the analogy of the animal kingdom, and partly from the direct study of vegetables, we can only refer to vegetable excitability." In some few instances, there is an appearance resembling *irritability* exhibited by plants, as the *Mimosa*, on the application of certain excitements; but this is very different from the irritability of animals, which is a proper appanage of muscular structure, and exists through all periods of life; while in plants, any such exhibition is rare and occasional, and is connected with nothing having the smallest analogy to muscular structure.

With regard to the existence of *sensibility* in plants, the same naturalists lean to the amiable idea, that it would be comformable to the wisdom and kindness of Divine Providence, to increase the general amount of happiness in the creation, by bestowing the means of enjoying it on the vegetable kingdom; yet this opinion is much more indicative of benevolence than philosophy; of imagination and feeling, rather than judgment and discrimination.

The seat of *vegetable excitability*, the author considers to be in the cells of plants, which he describes as separate membranous vesicles, made up of modifications of cellular tissue. He represents them as being originally oval or globular, as admitting fluid into them only by transudation, and as being endued during life and youth, with a vital contractility, somewhat analogous to the systole and diastole of animals, and to the contraction and dilatation of hydatids and the *Infusoria*. Cells he regards as peculiar to all classes of plants, even to those which, as the *Cryptogamia*, exhibit no appearance of vessels; and though it is not unusual to refer to the agency of a vascular system many of the phenomena of vegetation which would require some other system to be substituted where a vascular system is wanting; yet the author is disposed to believe, that such opinion is erroneous, and that the vessels usually regarded as circulatory are intended for the admission and circulation of air in the body of the plant, like the *trachea* or air-tubes, properly so called. The existence of such excitability, he thinks, is proved by the oozing out of their milky fluid, from both ends of the cut stalks of some plants, as the lettuce and *Euphorbium*, and the total interruption of the flow of such fluid as Van Marum and Humboldt discovered, when the plant is destroyed by lightning.

The thin transparent cells, which have hardly a trace of organization, jump up and absorb moisture without interruption or retardation from any external or adventitious causes; but in time they likewise become the agents by which various secretions are produced in plants, and in this way are rendered rigid, lose their contractility, become less and less active, and lose the excitability of vegetable life.

Light, heat, and electricity, all of them act as excitants to the performance of the particular functions which the cellular structure is destined to execute; and sometimes even external injuries give rise to modifications of its action, as in the production of nut-galls, from the wounds of insects in certain trees.

Having made these general observations as to the peculiar properties of vegetable matter, the author goes on to examine the mode in which nutrition is carried on in the vegetable world.

The nutrition of vegetables bears as much analogy to that of animals, as that of some particular species of animals does with others. In both there are the means of getting nourishment from without; of circulating it for the uses of the individual; of throwing off by transpiration what is unnecessary; of submitting the nutritious fluid to the influence of the air; and, finally, of forming from it a great variety of important secretions.

Vegetable nutrition has always water for its vehicle; and in considering the mode by which this is taken up, it will be found, that though leaves may imbibe some portion of water, and even wood itself, on mere hygroscopic principles, yet the main source is the roots, which, at their extremities, have small cellular expansions, by means of which they are enabled to take up water from the soil, for which the body of the root, with its covering of *epidermis* of various solidity, is not at all adapted. These expansions are termed by the author *Spongioles*, from their being porous, and resembling sponges; and as the roots grow, the fibres at their extremities increase and elongate, and thus offer their apparatus of spongioles to a greater extent of soil, in proportion as the wants of the tree are augmented. It is by a particular attention to this circumstance, that Sir Henry Steuart has been able to remove successfully trees of considerable size from one place to another. He carefully pursued the fibres of the roots to their utmost ramifications; and, by preparing a soft and pervious bed for their reception, secured such a supply of moisture as was necessary to preserve the life of the plant, if not to carry on its usual growth.

The particular structure of the spongioles acts partly by capillary, and partly by mygroscopic power; but it is also likely, the author thinks, that it is connected with a certain operation of the cellular structure, to which the greatly larger power of absorption in living plants, compared with dead ones, is to be ascribed.

Vegetables must find nourishment ready for their use, and fluidity seems to be the only object of desire. The roots will even more readily absorb a deleterious fluid, such as a solution of sulphate of copper, than a solution of gum or of sugar, on account of their viscosity, though those substances are well adapted for the nourishment of plants; for viscosity obstructs the fine pores connected with absorption, and will occasion the water of a dung-heap, though containing in it so much of the peculiar nourishment of plants, to have little of it taken up by them.

Whether there is any diversity in the organization of spongioles of different plants, has neither been determined by microscopic observations, nor by the mode in which exhaustion of soils is produced. With regard to the latter circumstance, indeed, the author is of opinion, that, considering the general action of manures, and the prodigious number of different plants which can grow in the same bed, little is to be attributed to differences in the actual absorbent power of vegetable substances.

But though water forms so principal an ingredient in the nourishment of plants, yet the admixture of other substances is necessary to flourishing vegetation, some of which every sort of water contains. Even rain and distilled water are not altogether pure; but, though they will support the life of plants, they are ineffectual to considerable developement. Van Helmont, indeed, found, that a willow which was watered with rain water, acquired, in five years, the weight of 150 pounds, without any diminution in the weight of the soil which contained it; but Du Hamel discovered very little increase in three years in horsechesnuts, and in eight years in oaks, both of which were watered with distilled water, and exposed to the open air.

Water may thus be considered as conveying in minute quantities, all the materials which enter into the composition of plants. It contains a variable quantity of atmospheric air, and thus introduces into the vegetable, a certain portion of oxygen and azote, and of carbonic acid gas. Oxygen may also be furnished by the decomposition of water, which will account for the pure or combined hydrogen found in many vegetables. With regard to azote, though not usually reckoned among the ordinary components of vegetables, it is found in the cruciform plants, as mushrooms, in the gluten of wheat, and in some of the other immediate products of vegetation, as indigo.

Carbon itself forms so large a portion of vegetable matter, that some ample means must be provided by nature for obtaining it. Considering its insolubility, however, this is to be looked for in carbonic acid gas, which is found, by comparative experiments, in the watering of vegetables with distilled water, or water charged with carbonic acid gas, to be exceedingly favourable to vegetation.

Saline materials, and even silex and iron, form impregnations of water, and impart certain portions of those materials to vegetable matters. It is well known, that plants growing near the sea have more of the mineral than the vegetable alkali in their composition; and Saussure found that the rhododendrum had a larger quantity of calcareous salts in it, when produced in a chalky, than in a granitic soil.

The author next goes on to consider the progress of the sap in vegetables; its force and quantity, and the causes of its ascent.

The *course* which the sap follows in its rise from the roots of vegetables, is a matter of great difficulty to ascertain; but M. De Candolle thinks that it ascends principally through the ligneous part of the plant; for it has been found that coloured water penetrates neither by the bark nor the pith, as has often been supposed, but always across the wood, sometimes in its whole extent, and sometimes in the younger part only. The position of this younger part varies according to the nature of the tree. Sometimes it may be in the interior of the trunk, as in plants to which the author has given, from this particular circumstance, the designation of *endogenous*, such as the palm, date, sugar-cane, and most of the trees which grow in tropical climates; and the graminivorous plants of this country. But most frequently it is in the exterior part, as in plants which he terms *exogenous*, where the growth takes place in successive layers, which are annually deposited, and regularly increase the circular dimensions of the tree. The ligneous part is some time in acquiring its proper solidity, and till this takes place, it forms the *albumen* or white wood of trees, which is much softer and more perishable than the heart, and is therefore rejected for any of the more substantial purposes to which wood is applied. This is the usual course of the sap; but in the early period of spring, when the buds first demand support, the ascent of the nutriment is confined to the innermost circle of the stem, contiguous to the pith, as has been discovered by the moisture communicated to any instrument employed in piercing through the wood to that extent.

We have already stated, that the author considers the vessels of such plants as possess them, to be intended to contain air, and not to circulate nourishment. The latter functions he attributes to the interstices which separate the different cells from each other, called by some *intercellular spaces*, through which the sap finds a ready passage in every direction.

If it were indeed by vascular agency that the circulation was carried on, there must be the necessary appendage of lateral communications, by means of direct or anastomosing vessels, neither of which are found to exist; while by the juxtaposition of one cell with another, there being no adhesion between their respective *parietes*, the universality of such a communication may be readily conceived.

In plants which contain milky juices, a singular variety of circulation has been observed by Schultz, to which the name of *cyclose* has been given. On viewing a portion of such plants with the microscope, the opacity is found to be occasioned by minute globules, the fluid containing which moves in peculiar vessels or currents with considerable rapidity, somewhat after the manner of the blood in the vessels of the frog.

The *celerity* and *force* of the motions of the sap have been objects of much attraction and interest, since the celebrated experiments of Hales on the subject. This philosopher found, that, in a fresh cut branch of a vigorous pear-tree, the sap rose eight inches in six minutes; and that, when he adapted a tube to the cut stem of a young vine, the sap in the tube rose to a height equivalent to a column of water of forty-three feet, and, therefore, to a pressure of more than two atmospheres, and five times greater than the force necessary to propel the blood in the crural artery of a horse.

The *means* by which so powerful a *force* is capable of being exercised has long been a subject of earnest inquiry among vegetable physiologists. But while the author is disposed to consider capillary attraction and its hygroscopic influence as being to a certain degree concerned in the phenomenon, he thinks they will go but a short way in accounting for it, and has recourse, therefore, to the vital power of the cells, which he regards as the prime agent in the operation. Considering these cells as endowed with vital contractility, he supposes that when a contraction takes place in the cells, the intercellular spaces are enlarged so as to supply the wood, and thus suck in the fluid, which is in contact with the spongioles; while the enlargement of the cells pushes on the fluid which has been received, even against gravity. A similar effect he considers as taking place in consequence of the exhalation from the leaves; for, as by this means a considerable quantity of fluid is carried off through their pores or *stomata*, the void is supplied by the ascent of more from the roots. Exhalation depends little on heat, but is much connected with light; so that gardeners place, in an obscure situation, flowers which they are anxious to keep long fresh. The dew drops found so plentifully on a great variety of plants and flowers are examples of exhalation so copious, as not to be carried off, in the ordinary way, by evaporation; and that this does not arise from dew is proved, as the author informs us, by the deposit being found equally on sheltered plants as on such as are in the open air.

The action of the atmosphere on nutrition, forms the next object of attention. Bonnet was the first who observed that green leaves gave out air when exposed under water to the sun's rays, and this Priestley discovered to be pure oxygen.

The knowledge of this fact, and the necessity that the water to which the leaves are exposed, should contain carbonic acid gas, threw much light on the subject of the present inquiry, of which the following may be regarded as a short summary.

The water which is absorbed by the spongioles of the roots, contains carbonic acid gas, which is carried by the sap into the green parts of the plant, where it is decomposed by the action of solar light, the carbonic becoming fixed, and the oxygen escaping in the form of gas. But the white, or as botanists term them, the coloured parts of plants, act very differently.

Those parts consist much of carbon, a portion of which unites with the oxygen of the atmospheric air, which obtains access to the vegetable, both above and below ground, and forms carbonic acid gas.

A part of this gas is thrown out and dispersed in the atmosphere, but the remainder is united with the water of vegetation, and, being carried to the foliaceous parts of the plant, where carbon is required, is decomposed. On the other hand, the water absorbed by the roots has in it a portion of soluble animal and vegetable matter, both which contain carbon; but as the green parts of plants, which part with oxygen by the action of the sun's rays, and condense carbon, have the faculty of attracting oxygen during the night, the carbon combines during the night with oxygen absorbed by them, and forms carbonic acid gas. This is afterwards decomposed by the solar light, and the carbon applied for the purposes of nutrition.

Thus it appears that vegetable respiration differs from animal, in fixing, instead of discharging, carbon.

But in considering that there is a double operation going on in vegetables, an absorption of oxygen, on the one hand, which tends to vitiate, and an evolution of it, on the other, which serves to improve the atmosphere, it may be inquired, whether these two processes merely balance each other, or whether a diminution or excess of oxygen is the permanent consequence of the process of vegetation. M. Th. de Saussure found, that where he inclosed in a balloon filled with atmospheric air, a small branch with leaves on it, which was attached to a trunk whose roots were in the ground, the vessels, in two or three weeks, contained a larger quantity of oxygen gas than before the experiment. This important result, added to the consideration, that the fixation of carbon can never take place except by a decomposition of carbonic acid gas, and a consequent evolution of its oxygen, leads the author to conclude, that vegetation is a process which *augments* the quantity of free oxygen in the atmosphere, and that it is thus intended by nature, to compensate for the oxygen absorbed by the respiration of animals, by combustion, and by dying or dead vegetable matter. The winds unceasingly keep the different component parts of the atmosphere in a state of accurate mixture, and thus the humble efforts of vegetable life, as the author expresses himself, exhibit striking examples of magnificent views in the general order of the universe.

When the sap has undergone that change which is produced in it by exhalation, by the influence of the air, and by the deposition of carbon in its leaves and shoots, it is then prepared for promoting the growth of the other parts of the plants, and which it effects by means of what is called the *returning sap*. The return as well as the rise of the sap takes place in the intercellular spaces; one part of it passes through the more succulent part of the bark, where it meets with no obstruction from the ascending sap, and therefore reaches the roots without interruption, and is employed in nourishing them. The other passes through the alburnum, and though it meets with the ascending sap, the two fluids exert probably a certain mutual influence on each other, which may serve some important purpose in the vegetable economy. But whether in the bark or the alburnum, the returning sap throws out a semifluid deposit called *cambium*, from which the alburnum and the inner layer or *liber* of the bark are formed. These not only act as a basis of deposit for the firmer material of which the body of the tree is to be composed, but, by means of their cellular structure, take a part in the important series of secretion and elaboration, which are continually going on in the substance of the vegetable.

Though the quantity of water in the ascending sap is diminished to about one-third, by the processes to which it is subjected in the leaves, yet it is still in a considerable degree aqueous, for it is in a fluid form only that it is calculated to carry freely through the different minute structure of the plant, the parts necessary for nourishment.

The descending sap may be regarded as acting in a way similar to the blood in the animal creation. It consists chiefly of gum, which is found to be composed of water and carbon, and this, therefore, is the product which may be inferred to arise from the process which the leaves carry on, of decomposing carbonic acid gas, and depositing carbon. The gum-water of which the descending sap consists is very readily changed, by the action of the secreting cells, into fecula, sugar, or lignine, all which substances, although very different in sensible qualities, are very readily convertible into each other, either in the chemical laboratory, or by the still nicer and more delicate operations of the vegetable machine.

The roots have the power of throwing out by exudation that part of the remaining sap, which either cannot be readily assimilated, or may be of an injurious nature. Of the latter circumstance, many examples have been furnished by M. Macaire, who found, that when plants were kept some days in lime water, or in weak solutions of acetate of lead, nitrate of silver, or common salt, and were removed, after very careful washing into distilled water, the roots throw out the injurious matter with which they were charged, just as animals often eject, *per anum*, poisonous substances which they may have swallowed.

After giving many interesting details relative to the more simple description of vegetable formations, the author goes on to the consideration of the secreted juices of plants.

There is no reason, in his opinion, for supposing that the secretion of resin, volatile oil, or any other of the great variety of substances formed in plants, is not the result of the vital action of the cells of plants, equally with the less elaborate products of sugar and fecula. Nothing like the glandular structure of animals is discernible in plants; but many of those particular juices, instead of being composed of carbon and water, or of the element of water in proportions necessary for forming that fluid, have an excess of hydrogen, and sometimes of oxygen, in their composition, with occasionally a portion of azote.

The secreted juices of plants are very numerous and diversified; and we shall mention two or three of the most interesting of them. The *Fraxinella* is found, in the evening of a warm and dry day, to exhale a fine vapour, which burns on the contact of a flame, but without injuring the plant. It arises from the evaporation of a volatile oil contained in its substance. Subcarbonate of ammonia is exhaled from the *Chenopodium Vulvaria*; and chlorine during the night from many marine plants.

The nettle owes its power of stinging to a mechanism not unlike that of the serpent. The hairs which cover it are hollow tubes, which, on being touched, press on a little gland or receptacle of caustic matter at their base, and thus convey a minute portion of the irritating fluid into any soft part which they may touch.

The *Jatropha urens* has a similar faculty; but the sting produces a vesicle, and this vesicle is capable of producing a second by inoculation. The caustic juice of the nettle has been found to be of an alkaline nature.

The secretions of many plants are intended to defend them against the softening effects of water; and for this purpose some have a deposition of a wax-like substance on their leaves; others of a fine powdery matter; and aquatic plants are covered with a glairy secretion, of which there are many well-known examples.

It has been already stated, that plants partake in some degree of the nature of the soil in which they grow; and this leads to the inquiry, whether mineral substances are to be considered as forming a necessary part of the vegetable kingdom, or as being strangers to it, and entirely adventitious.

Considering that chemical analysis exhibits in vegetables a great variety of substances of mineral origin, and that every description of soil and natural water affords to the plants connected with them, some portion of their respective components, it is hardly possible to avoid the conclusion, that a certain quantity of the numerous matters thus supplied is necessary to the healthy growth of the plant.

Lime, magnesia, silica, and alumina, are the principal earthy substances found in vegetables, of which lime and silica are the most important and copious; but besides these, plants contain the alkalis in considerable quantity, and occasionally small portions of iron, manganese, and copper, and of chlorine, iodine, sulphur, and phosphorus.

It will be readily seen that these substances, particularly lime and the alkalis, afford many opportunities for the formation of a great diversity of products, when modified by combination with the secretions of the plant.

The composition of plants differs a good deal, according to the nature of the soil in which they grow, as we have already had occasion to observe; and nature allows a considerable variety in this respect, consistently with healthy growth. There are, however, limits which cannot be passed over; for Davy found, that when oats were planted in a soil principally composed of carbonate of lime, vegetation went on badly, and they contained much less than the usual portion of silicious matter.

The mode in which mineral substances find their way into the plant is a consideration of much difficulty, considering the great insolubility of many of them, and the considerable portion of such substances which exist in many vegetables. Silica, for example, which is one of the most insoluble, has been found to amount to 51 per cent. in the ashes of wheat with the grains, and to 61.5 without the grains; in the ashes of barley to 57 per cent. and without the grains to 35.5; in the grains of oats to 60 per cent.; in the epidermis of the sugar-cane to 90 per cent; of the bamboo, to 71.4 per cent.; of the rose tree, to 48.1 per cent.

The leaves of the oak in autumn contain of silica 14.5, of the black poplar 11.5, and of the hazel 11.3 per cent.

Silica, when deposited, remains fixed in the same spot; but the leaves in deciduous plants, carry off, by their fall, a large quantity of this substance, which might otherwise encumber and oppress.

The small difference between the specific gravity of sap and water, though it increases according to its height in the body of the plant, shows distinctly that the impregnation of mineral matters must be exceedingly minute. M. de Saussure found that the quantity of earthy salts is in proportion to the force of suction, and the intensity of evaporation, which may be readily inferred from the consideration, that a very large quantity of a fluid, having in solution the minute portions which water is able to dissolve of the earths, must pass through the body of the plant, in order to deposit the considerable amount which the ashes are found to contain of them.

The account which we have given of the author's views on the subject of vegetable nutrition has been hitherto confined to what he terms *vascular vegetables*. Of the nutrition of the cellular vegetables, or the *Cryptogamia*, little need be said.

Cellular vegetables have no pores or *stomata* for the purpose of exhalation. Hence their absorption is very limited, and they can have little of the earthy, saline, or metallic substances in their composition, which water is the means of conveying into the vascular. Water penetrates them, either in given points, or over their whole surface, and reaching the cells, performs in them all the functions of which the plant is capable. The cells seem to the author to act to a certain degree independently of each other, to have a sort of separate individuality, and to be the sole agents by which the very limited actions of this singular tribe of plants is carried on.

We have thus given at considerable length the views of M. De Candolle on vegetable nutrition, and we now defer to the next Number the conclusion of the article.

ART. V.—*Parallèle entre la Taille et la Lithotritie, &c. Parallel between Lithotomy and Lithotrity.* By PH. F. BLANDIN, Surgeon to the King, Surgeon to the Hospital of Beaujon, &c. 8vo. Paris, 1834. Pp. 167.

IT must be known to most of our readers that the medical professorships in France are bestowed upon those who, upon comparative trial, appear to be best calculated to fill them. One of the proofs of ability required is the writing and defending publicly a thesis, the subject of which is chosen by lot.

Last summer the chair of Clinical Surgery became vacant. M. Blandin declared himself a candidate, but was not successful, the choice having fallen on M. Velpeau. The subject on which it fell to M. Blandin's lot to write was a comparison between lithotomy and lithotrity, and nine days were allowed for the composition of the thesis. The time was short; but the certainty of its being criticised by rivals, both acute and interested in depreciating its merits, was stimulus sufficient to make the author put forth all his powers.

Two methods present themselves of treating this subject. The one consists in drawing a complete parallel in all points between the two operations, the other in omitting all detail, and trying impartially by the test of experience the merits of both. Limited, however, as the last may appear, it is attended with difficulties which produce no ordinary embarrassment, inasmuch as lithotomy and lithotrity are two *genera* of operations, so to speak, of which there are infinite varieties and species, rendering it difficult to draw any parallel between them.

M. Blandin divides his thesis into four parts:—The first consists of a short view of the history of lithotomy and lithotrity; the second of a comparative examination of the accidents following lithotomy and lithotrity; the third of a comparative examination of the cases in which the one operation may be preferable to the other; and the fourth of a comparison of the clinical results obtained by lithotomy and lithotrity.

As the substance of the first part, which we consider to be rather out of place in an essay of this description, is to be found in some works in common use, we do not think it necessary to take up the reader's time with it.

In the second part, M. Blandin institutes a comparison between the consequences of lithotomy and those of lithotrity in the normal state, by which we understand him to mean the simplest and most successful cases. The first inquiry naturally is into the amount of suffering produced by each operation. The pain felt from lithotomy results first from the incision, and then from the distension of the opening by the forceps and stone which they remove from the bladder. The first is acute; but without any particular character, while the second produces a sensation of laceration and tearing, severe in proportion to the size of the calculus compared with that of the opening. *Cæteris paribus*, lithotomy performed in the hypogastric region is much less painful than that performed in the perineal.

In lithotrity, pain is produced at three distinct periods of the operation; at the moment of introducing the instrument into the *urethra*, and especially into the *meatus urinarius*—during the researches necessary to seize the calculus, and during the crushing of the stone. The pain of catheterism is often very acute, and referred by the patient to the *meatus urinarius*, the narrowest part of the canal, which is sometimes divided when the lithotrite is introduced. The pains occurring during the second and third periods of the operation proceed from the neck of the bladder. They vary in intensity in different individuals, being very acute in a great number, while in some they are scarcely felt. At the first sitting they are very intense in some and slight in others, and, what is very remarkable, they diminish in the former at subsequent sittings, while they increase in the latter. Farther, the pain is so insupportable in some cases, that it would be quite dangerous to continue the operation till by baths and narcotics the irritation be subdued. By repeatedly introducing the catheter, however, before the operation, the patient may be accustomed to endure the contact of instruments and the operation itself. The question now is, which of the operations is on the whole the least painful? From lithotomy the pain is acute but transient; from lithotrity, on the contrary, it lasts long. After lithotomy, till the wound be cicatrized, the patient is tormented with severe smarting every time the urine is passed. The pain of lithotrity is assuaged after the operation; but in many cases it is necessary to excite it anew, more acutely even than at first, and that more or less frequently, according to the difficulty encountered in bruising the stone. Upon the whole, M. Blandin concludes, that the pain resulting from lithotrity is greater than that occasioned by lithotomy. In the latter, too, it must be borne in mind, that the pains are external, while in the former they are deep-seated, and extend to the kidneys.

Lithotrity has an advantage over lithotomy, which more than compensates for the preceding disadvantage—it requires no cutting, which is the fatal point in lithotomy. Lately, indeed, M. Civiale has proposed to render lithotrity applicable to childhood, by making a small opening in the perineal portion of the *urethra*, and introducing the instruments through it to the bladder. In judging of this innovation in the absence of all experience, recourse must be had to reasoning. On considering the matter, the following objections present themselves; 1*st*, That a wound is to be made in a part of the body most abundantly provided with veins, and these with an erectile disposition; 2*d*, That lithotrity would thus be endued with a share of the accidents of lithotomy; 3*d*, That it is not a new operation, but the modification of an old one, practised for some time by Frére Côme, as the first step in performing the high operation, but afterwards abandoned by him as increasing the severity of lithotomy.

But though lithotrity has the advantage over lithotomy in not requiring cutting, the incision necessary in the latter is declared by M. Blandin to be productive of positive benefits; for not only does the blood lost moderate inflammatory action,—the division of the deep parts permit swelling to take place without strangulation, and the matter when found to escape easily,—but it acts as a drain on the mucous and other tissues of the bladder, frequently causes catarrhs and indurations produced by the calculus to disappear, and thus, when the wound is cicatrized, the patient finds himself cured at once of his *calculus* and of all the evils produced by it. Such is not the case when lithotrity is employed. For a long time after the entire destruction of the calculus, a degree of sensibility remains in the hypogastric region, accompanied by a frequent desire to make water, and pain in so doing, while the urine remains long glairy or bloody. This arises from lithotrity irritating the interior of the urinary passages more than lithotomy. In a word, lithotomy speedily frees the bladder from the concretion, and facilitates the draining of the parietes, while lithotrity acts on the stone slowly and with an increase of the irritation in general excited in the mucous membrane of the bladder.

M. Blandin thus sums up the effects of lithotomy and lithotrity in the most favourable cases.

1. In general the sum total of the pain is less in lithotomy than in lithotrity.

2. Lithotomy has this immense advantage over lithotrity, that it is not necessary to wound the soft parts external to the bladder,—an advantage which it would lose in children almost without any compensation if the perforation of the *perineum* were associated with it.

3. The wound in lithotomy is not in all respects disadvantageous, as it permits the prompt removal of the foreign body, while without this wound, lithotrity destroys the calculus with remarkable slowness.

4. Lithotomy, by the wound which it produces, acts in an efficacious manner on the vesico-prostatic engorgements, which are found in a greater or less degree with calculi. Lithotrity increases these engorgements by the irritation which it excites, and does not, like lithotomy, produce an immediate draining of the affected parts.

5. In fine, when lithotomy does not produce extraordinary accidents, and when these follow their natural course, the calculus is not only more promptly removed, but the cure is more complete than in lithotrity.

On examining these conclusions, it appears to us that the second is inconsistent with those which follow it. *First*, it is asserted that lithotrity has an *immense* advantage over lithotomy, in requiring no incision, and immediately afterwards it is stated, that this very incision is productive of the most important benefits. This contradiction can be attributed only to the rapid manner in which the thesis was got up. We suspect, however, that M. Blandin has exaggerated the advantages derived from the incision necessary in lithotomy, in curing the irritation and engorgement of the bladder caused by the presence of a calculus. Any beneficial changes in these respects must be attributed to the removal of the cause of the irritation, for the incision would rather excite than subdue inflammatory action.

The second chapter, containing a comparative examination of the results of lithotomy and lithotrity in the anormal state, that is, in severe cases complicated with accidents, is divided into two parts, the first treating of accidents resulting from lithotomy, the second those from lithotrity.

Lithotomy may give rise to two kinds of accidents, those resulting immediately from the operation, and those following it at a longer or shorter interval. The primitive accidents of lithotomy are those which occur during the incision, during the extraction of the calculus, and from the effects of the operation on timid or nervous patients.

The cutting of the soft parts may give rise to hemorrhage, lesions of the *rectum*, *peritoneum*, *vesiculæ seminales*, *ductus ejaculatorii*, *vasa deferentia*, and superior perineal *fascia*. During the extraction of the calculus, laceration of the neck of the bladder, the prostate, or even of the *rectum* itself may occur, and the bladder may be pinched. Besides all this the feeble and pusillanimous are so terrified, in some irritable patients the pain is so excessive, and in others the operation so tedious, that they fall into a state of collapse, and sink in a short time.

The consecutive accidents are numerous and severe, such as hemorrhage, infiltration of urine, ecchymosis of the *scrotum*, inflammation of the cellular tissue of the *pelvis*, pelvic *phlebitis*, *peritonitis*, *cystitis*, inflammation of the prostate gland, urinary *fistulæ*, impotence, incontinence of urine, and reproduction of the stone.

On all these dangers of lithotomy, primitive and consecutive, M. Blandin dilates at some length, occasionally illustrating his positions by the narrative of cases. As, however, there is nothing new in his views, we shall not follow him into his details, but pass at once to his account of the unfortunate circumstances which may arise from lithotrity.

By several authorities it was asserted, that the crushing of the stone was one of the most simple operations, and that it was altogether incapable of producing the smallest accident. This, however, is no longer maintained; for the accidents resulting from this operation are as various as those of its rival. Among these are enumerated pain and nervous affections, inflammation of the urinary passages, *peritonitis*, inflammation of the prostate gland, pelvic *phlebitis*, *didymitis*, laceration of the mucous membrane of the bladder and *hæmaturia*, perforation of the bladder, and infiltration of urine, urinary *fistulæ*, breaking of the instruments in the bladder, and reproduction of the stone.

The repeated introduction into the *urethra* of an instrument so voluminous as the lithotriteur, and its coming in contact with, and its expanding and motion within an organ inflamed, or at least irritated, cannot be accomplished without pain; and in some patients the exquisite sensibility of the bladder is so much increased, that the most acute anguish is excited, and the most severe accidents are the result. M. Blandin quotes two instances of patients dying in consequence of the irritation. Lithotrity undoubtedly is not alone to blame in such cases; at the same time it is impossible to deny that it has some influence in producing the disastrous consequences.

Of all the accidents resulting from lithotrity, inflammation of the urinary passages is the most common and most constant, as is proved by the pain, frequent desires to make water, and the ejection of mucous matter each time. Within ordinary limits it is only a natural occurrence; but carried farther it becomes dangerous. Sometimes it is limited to the parts which come in contact with the instruments, as the *urethra* and bladder, and sometimes it is propagated to the ureters and kidneys. In the former case it becomes a complete obstacle, at least to the immediate performance of the operation; in the latter it places the patient in urgent danger. These remarks are illustrated by two cases, one of which terminated fatally, and in the other the stone remained, in consequence of its being impossible to proceed with the operation.

Cystitis produced by lithotrity presents this remarkable character, that, if it do not immediately produce dangerous results, it continues long and passes into the chronic state. Inflammation of the urethra is the natural consequence of the operation, and need hardly be mentioned. Few instances of *peritonitis* have come to M. Blandin's knowledge. M. Tanchou mentions one case. It can hardly occur except when the neck or body of the bladder is lacerated.

Inflammation of the prostate gland occurs from the pressure excited on it by the instruments, and the acute pain experienced by certain patients are to be referred to this. Sometimes the irritation of the prostate during the operation is limited to producing enlargement of it, at other times it gives rise to suppuration and abscess. In the first case, the tumefaction begins at *uvula vesicæ*, and retention of urine is the result; in the second the patient, worn out by the irritation, is often obliged to abandon all attempts at the operation.

Circumstances so favourable to the developement of inflammation in the neck of the bladder, must sometimes act in a more special manner on the veins of this part; but this affection ought to be much more rare after lithotrity than after lithotomy, because in the former the veins are not so directly affected as in the latter.

Didymitis, or inflammation of the testicle, is one of the most common and least severe accidents connected with lithotrity. From the intimate connection which exists between the prostate portion of the *urethra* and the secreting organs of the semen, it is easy to comprehend how this takes place. Sometimes the testicle appears to swell sympathetically, without the cord being previously affected, at other times the inflammation is evidently propagated to it by the *vasa deferens*.

When the forceps with three branches was generally used, the pinching and laceration of the mucous membrane by the litholabe must have occurred more frequently than some were inclined to admit, especially when the bladder could not bear to be injected. Without speaking of the small portions of mucous membrane caught by the extremities of the instrument, the *uvulae vesicæ*, which is usually enlarged in patients with calculi, must frequently have been entangled in the interval of the branches of the instrument, and thus have been exposed to lacerations more or less extensive. This, however, is now obviated by the improvements made on the instrument. The *urethra* may be also lacerated either by the instrument, or voluminous and irregular fragments entangled in it.

Perforation of the bladder was observed by M. Breschet, but, as the accident occurred only in the infancy of lithotrity, and is now likely to be impossible, it need hardly be mentioned.

Though infiltration of urine is a rare accident in lithotrity, it may occur when the urinary passages are lacerated, of which there have been several instances. The danger will necessarily depend upon the portion ruptured.

Retention and incontinence of urine may equally supervene in lithotrity. Incontinence is rare, and M. Blandin suspects that acute *cystitis* has often been mistaken for it. The difference between the two is, that in *cystitis* the contractility of the bladder is so increased that it quite overcomes the resistance of the neck of the bladder, while in true incontinence the equilibrium is destroyed by want of resistance in the neck. How retention may take place has been shown above.

Urinary *fistulæ* of various kinds may be formed from the various perforations and infiltrations which may take place. Breaking of the instruments in the bladder is of rare occurrence, in consequence of the care taken in the making and choosing of them. Instances, however, have occurred, of which M. Blandin details two.

On comparing the accidents of lithotomy and lithotrity occurring without the urinary passages, the balance is in favour of lithotrity.

1*st.* The hemorrhage is often severe in lithotomy, but almost impossible in the case of lithotrity.

2*d.* The *rectum*, *peritoneum*, and other important organs, may be wounded in lithotomy; they have sometimes been involved in lithotrity, but these, rare hitherto, are rendered almost impossible with the new instrument.

3*d.* Infiltrations, *phlebitis*, *peritonitis*, and *fistulae*, frequently observed after lithotomy, are not at all common after lithotrity, as now performed.

On comparing the accidents which have their origin in the urinary passages, the balance is in favour of lithotomy.

1. Pain and nervous accidents have occurred to a great extent in both, but lithotrity, being more prolonged, and more frequently repeated, in general increases their severity.

2. *Cystitis* is a very severe complication of lithotrity, while in lithotomy it is of less importance.

3. Inflammation of the prostate terminates in abscess, and produces retention of urine, and severe accidents after lithotrity, but is of secondary importance after lithotomy.

4. The bladder may be punctured or torn in lithotrity, but this accident never or scarcely ever happens in lithotomy.

5. Pieces of instruments may fall into the bladder in lithotrity, and make a severe operation necessary ; nothing of the kind can occur in lithotomy.

6. Lithotrity is as powerless against the calculous diathesis as lithotomy, while there is a greater chance of some fragments being left to form the nucleus of another stone.

In the fourth part, M. Blandin inquires into what cases the one operation is preferable to the other. He gives it in favour of lithotomy in cases of large calculi, when they are exactly embraced by the bladder. When the calculi are flattened, of a dense matter, as oxalate of lime, or partly entangled in the *urethra ;* when the bladder is paralyzed, or the prostate considerably swollen ; when the bladder is divided into compartments, and its muscular coat hypertrophied ; or when there are severe affections of the kidneys or ureters, though in these cases the chance of recovery is small; when the patient is under twelve or fifteen years of age, and perhaps when a female. Thus, according to M. Blandin, lithotrity is applicable only to a few simple cases.

So far the parallel has not been favourable to lithotrity; but when the question comes to be tried by the proportion of successful cases in a given number, the balance is still in favour of lithotomy.

M. Blandin, before bringing the comparison to a conclusion, brings forward two questions, to which he furnishes answers.

1*st.* Was the mortality greater formerly, when the operation of lithotomy was less perfect, and the only one in use to remove calculus?

2*d.* What, now, is the comparative success or failure of lithotomy and lithotrity?

To answer the first, M. Blandin collects all the cases reported by Frère Cosme, Douglas, Cheselden, Middleton, Marcet, and those performed at the Hôtel-Dieu and La Charitê, from 1720 to 1727, and finds the whole to be 1451, operated on at different times in different places, and in different ways. Of these 1085 were cured, and 346 died, giving, as the proportion of deaths to cures, one to something more than three.

On the other hand, combining the facts from the work of Bancal, the reports of Larrey and Double on the returns of the *Hôpital Necker*, by M. Civiale, and the memoirs of Heurteloup, the number of patients affected with calculi, and operated on principally by lithotrity, he finds to be 124, of whom 36 were cured, 30 died, and from 8 the stone was not removed; and leaving out of consideration the latter, the proportion of deaths to cures is one to less than three. Thus lithotomy, when surgery was less understood, and the *apparatus major* was employed, was more successful than lithotrity and lithotomy at present combined.

If we compare lithotrity with lithotomy of the present day, the advantage is greatly in favour of the latter. Taking the facts mentioned by Dupuytren in his clinical lectures, those of the Hospital of Naples in 1831, those derived from the work of M. Belmas, as well as those of Vacca Berlinghieri, the amount is 537 calculous patients operated on by lithotomy, of whom 431 were cured, and 106 died, thus giving the proportion of deaths as one to something more than four. The data are not perhaps correct, but they furnish a near approximation to the truth.

We terminate this account of M. Blandin's thesis by giving a summary of his conclusions.

1. Lithotrity may be the companion of lithotomy, but can never displace it completely.
2. If employed in every case, it would be inferior to lithotomy.
3. Lithotrity, by crushing, is inferior to that by successive perforation, which is superior to lithotomy.
4. The results of both modes of lithotrity, taken together, are less favourable than those of lithotomy.
5. It is impossible to say what advantage lithotomy might have if it selected its cases.
6. The cure obtained by lithotomy is perhaps more perfect than that obtained by lithotrity.

The work before us is far from being a satisfactory discussion of the subject. Nine days, the time allowed for its composition, was far too short to do it justice, and the data of which we are in possession are liable to be disputed. It may be remarked, that the question has been for some time before the French Academy, and that they have not yet pronounced any decision on it.

Art. VI.—*Frederici Arnoldi, Icones Nervorum Capitis, Heidelbergæ. Sumptibus Auctoris,* 1834. *Folio, cum Tabulis Lithographicis Nonis.—Figures of the Nerves of the Head.* By Frederic Arnold. With nine Engravings, Lithographed. Folio. Heidelberg, 1834.

To the readers of this Journal, Frederic Arnold must be well known as a diligent and learned demonstrator of anatomy, and as the individual who first gave an accurate description of the otic ganglion. He is further known, we may add, for the indefatigable perseverance, and the minute accuracy with which he has studied the anatomical relations of the nervous system for several years past.

Our anatomical readers are aware, that, of most of the individual nerves of the head, the origin, course, ramifications, and distribution, have been described and delineated with much minuteness and fidelity by various able anatomists. Thus *Metzger* and *Scarpa* have described the anatomical relations of the olfactory nerves; *Zinn* has given a very correct account of the optic nerve, as well as of the third and fourth pairs of cerebral nerves; *Meckel* and *Wrisberg* have, in their account of the division, course, and distribution of the fifth pair of nerves, set an excellent example of accuracy and fidelity; *Palletta* describes minutely its motiferous or small portion, which supplies the temporal, masseter, and buccinator muscles; and more recently, *Bellingeri* has presented a history of the anatomy of this nerve and its branches, which may be pronounced to be complete in the present state of anatomical knowledge. Of the anatomy of the seventh pair or facial nerves, several important facts have been communicated by *Meckel* and *Sir Charles Bell*, and *Mr Mayo*. The auditory nerve has been studied by many, but most fully by *Cotunni*, *Meckel*, *Scarpa*, *Comparatti*, and the second *Monro*. The glossopharyngeal nerve has been described and delineated by *Andersch*, *Neubauer*, *Scarpa*, and *Wrisberg*; and the hypoglossal by *Scarpa;* and *Soemmering* has given a most accurate view of the basis of the brain, and the cerebral extremities or origins of all the nerves together.

Notwithstanding, however, the labours of these learned anatomists, no connected view of the whole assemblage of nerves of the head, in their mutual relations to each other, in course and distribution, as well as origin, has yet been given; and none, as Arnold remarks, which is worthy of the present state of anatomical and physiological science, has been yet submitted to the student of the nervous system.

Seven years ago, when he was engaged in a minute and careful investigation of the anatomy of the head, and especially of its nerves, the deficiency now mentioned was very keenly felt by Arnold; and, as these researches led him to propose several rectifications upon the anatomical history of the nerves of the head especially, and to entertain several new and ingenious views regarding their origin, mutual connections, and distribution, and as no work on all the nerves of the head in connection was extant, he was led to supply the deficiency by publishing the short description and delineations now before us.

We might, with great safety, pronounce our judgment in general terms of commendation of the manner in which M. Arnold has performed the task thus undertaken; but the accuracy and fidelity with which these nerves are represented, the precise and instructive manner in which not only each nerve, but the different constituent parts of the same nerve, are distinguished and traced, and the general importance of the work as a Neurographical Treatise, require that we should specify more minutely its characteristic merits.

In the *first* place, the delineations are given with the most scrupulous regard to fidelity, from preparations expressly dissected for the purpose; and the correct relative position and dimensions of individual nerves have been observed with so much attention, that sometimes a variable condition of the same part may be distinguished upon comparison of the several figures.

The author further assures us, that he has admitted into these figures no nervous filaments, about which any doubt could arise, either as to nature or size, or any other character; and even those parts about which, as being first described as nervous by himself, some doubt might be entertained, viz. the *ganglion oticum*, he expresses the confident expectation, that time,—that is, we presume, the course of anatomical inquiry,—will finally prove to be what he represents them. He admits, nevertheless, the possibility of committing some trivial oversights on unimportant points; but all those of any consequence he represents to be perfectly correct.

We shall shortly advert to the arrangement which the author observes in describing and delineating the nerves of the head.

Commencing with the principle that, as the head is the seat of the organs of proper sensation, the nerves of the animal life predominate in this region over those of the vegetative or organic life, he adds, that, in the head, the arrangement of the two systems is the converse in number and order, of that which it is in the abdomen, in which the vegetative or organic principle is most powerful.

The nerves of the ganglions are distributed chiefly to the arteries; the cerebral and spinal nerves transmit their branches to the voluntary muscles and the organs of touch; the cephalic or superior part of the sympathetic nerve sends numerous filaments to the external and internal carotids and the vertebral arteries; while many form anastomotic communications with the nerves of the neck and brain.

As the arrangement and distinctions observed in the present work not only accord closely with several of the distinctions made by Bellingeri, Bell, and Mayo, but illustrate, in a very interesting and beautiful manner, most of the physiological principles of the first of these authors, and as this classification is the only one in which these physiological illustrations are clearly given in an anatomical treatise, we think it cannot fail to be instructive to give a short sketch of the system of arrangement, and distinction of the nerves of the head, now proposed, and so ably explained by the present author.

It is necessary to premise, that Arnold does not regard each nervous trunk as it issues, or seems to emerge, from the brain, as a separate nerve. In opposition to the usual practice of anatomists in this matter, he regards several nerves considered by others as separate, as, in truth, concurring to form one nerve. Thus, the only individual nerves which he admits are the first, the second, and the eighth pairs, *i. e.* the olfactory, the optic, and the auditory. The third, fourth, the small part of the fifth, and the seventh, he allows only to form a single nerve; and, in like manner, he converts the ninth, tenth, eleventh, and twelfth, into a single pair of nerves.

It is further necessary to inform our readers, that throughout the whole of his distinctions, M. Arnold adopts the theory originally proposed by Peter Frank[*] and Burdin,[†] and afterwards espoused by Kielmeyer,[‡] Dumeril,[§] and Goethe,[‖] and more or less fully elaborated, illustrated, and maintained, by Oken,[¶] and Spix,[**] Blainville[††] and Geoffroy St-Hilaire, Carus,[‡‡] Meckel,[§§] Schultz,[‖‖] Bojanus,[¶¶] and Burdach,[***]—viz. that the *cranium* is a series of *vertebrae*, formed according to the type of these bones, and presenting, consequently, the same relation to the soft parts. In the adoption of this principle, however, he confines himself to the views given by Oken, Cuvier, Carus, Spix, and Meckel, that the *cranium* consists of three *vertebrae* only, and does not appear to look with much favour on the doctrine of Bojanus, who admits four, and much less so on that of Geoffroy St-Hilaire, who believes that he can demonstrate the existence of seven *vertebrae* in each scull. It is easy to perceive, that, as it is not agreed what is the precise number of cranial *vertebrae*, it must be equally uncertain in what manner, or upon what principle, we are to enumerate, and arrange, and distinguish, the cranial intervertebral nerves.

Independent, however, of this natural difficulty in the application of this piece of osteological theory, there is yet another not less embarrassing, in the circumstance, that all anatomists are by no means agreed as to the exact lines of demarcation between the various constituent *vertebrae;* and we find one view given by Oken, another by Spix, a third by Carus, and a fourth by Meckel.

So far as we understand the distinctions established by M. Arnold, he appears to follow, with little deviation, the method of division observed by Carus and Meckel. He makes the *cranium* consist of three *vertebrae*,—the occipital or posterior, the parieto-temporal or middle, and the fronto-sphenoidal or anterior; and in this manner, consequently, he admits, as we have already stated, only two pairs of cerebral nerves. It is not quite so easy to discover where he draws the intervertebral lines; but, it is manifest, from the distinctions presently to be mentioned, that one must pass through the superior orbital fissure, or the *foramen lacerum superius* of the sphenoid bone on each side, and that the other must pass through the *foramen lacerum*, in the base of the cranium, or the occipito-temporal fissure. The nerves emerging by the former aperture, he groupes together under the head of the anterior pair; and those emerging by the latter, he designates as the posterior pair. As in this arrangement, however, the seventh pair, which issues by the Fallopian aqueduct, and the ninth pair, or glossopharyngeal, which emerges by the anterior part of the *foramen lacerum posterius*, are not included, the author regards them as not genuine intervertebral nerves, but as rather presenting a mixed character.

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[*] Epit. de Curand Hom. Morb lib. ii. p. 42.

[†] Cours d'Etudes Medicales. Paris, 1803. Tome i. p. 16.

[‡] Ulrich Annotationes quædam de sensu ac significatione ossium Capitis. Berlin, 1816, p. 4.

[§] Magasine Encyclopedique, Tome iii. 1808.

[‖] Zur Naturwissenschaft, Tome i. p. 250.

[¶] Ueber die Bedeutung de Schadelknocken. Jena. 1807. Isis, 1820. No. 6, p. 552.

[**] Cephalogenesis Munich, 1815.

[††] Bulletin de la Societé Philos. 1816, p. 111 and 1817.

[‡‡] Lehrbuch der Zootomie. Leipzig, 1818, p. 164.

[§§] Beytrage zur Vergleichende Anatomie, Band ii. Stuck ii.

[‖‖] De primordiis Systematis Ossium etc. Halle, 1818, p. 13.

[¶¶] Isis, 1818, p. 301. 1819, p. 1364.

[***] Vierter Bericht von der Anatomischen Anstalt zu Koenigsberg. Leipzig, 1821.

It will be afterwards seen, that, in accommodating this theory to his views, he takes considerable liberties with the cranial apertures, and does not scruple to admit a greater number of intervertebral holes than, according to the theory, he is entitled to do. Thus the *foramina rotunda* and *ovalia* of the sphenoid bone, and the anterior condyloid holes, are all converted into intervertebral holes in the course of the demonstration.

The explanations now made, though neither full nor minute, are, however, necessary to enable our readers to comprehend the subsequent distinctions, and even the entire system of description and arrangement observed by M. Arnold; and we trust that they will be of some utility in this respect. We now proceed with the distinctions of the author.

Adopting the general division established by Soemmering, which is unquestionably the best, Arnold distinguishes all the nerves of the brain into two classes,—one comprehending the nerves of the senses proper; the other the intervertebral nerves of the *cranium*. To the former belong the first, or olfactory, the second, or optic, and the eighth pair, or the auditory nerves; and to the second he refers all those other pairs of nerves which, like the spinal nerves, derive their origin from the brain by means of a double root, an anterior and a posterior, and emerge between the vertebral bones of the *cranium*.

The intervertebral nerves of the head he then subdivides into two pairs,—an anterior and a posterior. The anterior comprehends the third pair of cerebral nerves, and the subsequent ones as far as the seventh; and the posterior embraces the inferior nerves, from the ninth to the twelfth pairs.

The posterior root of the anterior intervertebral nerve is the larger portion of the fifth; the anterior root is formed by the third, fourth, and sixth pairs of nerves, and the masticatory nerve is the smaller portion of the fifth.

The anterior root of the posterior intervertebral nerve includes the eleventh and twelfth cerebral nerves; and the posterior root consists of the tenth pair only. Between both these roots, the seventh and ninth pairs hold an intermediate place; and the facial and glosso-pharyngeal nerves may, therefore, be said to be mixed nerves. Upon this principle M. Arnold exhibits the following tabular arrangement of the cerebral nerves.

Class First.		olfact. I. optic. II. acoustic. VIII.	
		Anterior intervertebral nerve.	Posterior intervertebral nerve.
Class Second.	Roots. Anterior.	oculi mot. trochle. abduct. III. IV. VI. V. masticatory part. facial. VII.	XI. XII.
	Roots. Posterior.	Sensitive or facial. V.	IX. X.

He also proposes another arrangement of the cerebral nerves equally natural; viz. of the nerves belonging to the intervertebral pairs, both anterior and posterior, and simple or motiferous, and compound or motiferous, and sensiferous. To the former he refers the third, fourth, sixth, and twelfth; and to the latter the fifth and seventh, the tenth, with the eleventh and ninth. This arrangement is placed in the tabular form in the following manner:—

		I. II.	VIII.
Class First.	The intervertebral nerves. Anterior.	Mixed nerves. V. VII.	Simple nerves. III. IV. VI.
Class Second.	The intervertebral nerves. Posterior.	X. XI. IX.	XII.

To each of these cerebral nerves this peculiar office is allotted, that the third, fourth, and sixth nerves move the eye, the twelfth the tongue, and that the fifth pair ministers to the sensations of the face, the nostrils, and mouth; and that the tenth pair, or pneumogastric, regulates the sensations of the stomach, *larynx*, and lungs. To the fifth pair is superadded the small or motiferous portion as a masticating nerve, and to the tenth (the pneumogastric,) is added the eleventh, as a vocal and respiratory nerve. The larger portion of the seventh is the motiferous nerve of the face; the smaller portion is a sensiferous nerve. The ninth pair consists of two parts, a large and a small; by the former it completes sensation in the root of the tongue and *pharynx*, and by the latter it moves the *pharynx*.

The nerves of the first class, or those ministering to the organs of proper sensation, differ greatly from the other nerves of the brain in structure, formation, and vital property. They send no branches in their course; in structure they agree more with the substance of the brain than the intervertebral nerves; they proceed in the fœtus, that is, in early developement from the cells or chambers of the brain; and they are susceptible of peculiar irritations only, as light, sound, and odours.

The intervertebral nerves of the *cranium* agree in structure with the spinal nerves. They issue from the brain by two roots, an anterior and a posterior, the latter being provided with a ganglion, and composed of many minute filaments proceeding to the ganglia; while the former, though composed of several threads, immediately from its root forms a roundish trunk. The intervertebral nerves distribute their filaments both in their transit, and also when they enter the various organs. They neither rise from the brain, according to the author, nor from the spinal chord, but are formed by themselves in that spot in which they appear. They are susceptible of irritations of various kinds, so that they may either excite muscular motion or sensation; and the impressions are conveyed in different lines by their anterior and posterior roots. "Therefore," concludes the author, "while one series of nerves transmits the conditions of the brain and spinal chord to the organs by which motions may be affected,—and another series conveys the external impressions and affections of the organs to the central regions of the nervous system, by which sensation is excited, the intervertebral nerves may be divided into motiferous and sensiferous nerves." Our readers may remark, that this view corresponds exactly with the *associated circle of nerves and nervous communication between the brain and the muscles or organs*, taught by Sir Charles Bell, and the *Reflex Function* imagined by Dr Marshall Hall to reside in the spinal chord, and to minister to various instinctive acts, by an action reflected, as he believes, from the remote organs to the brain.

As the anterior root of the spinal nerves is conceived to minister to motion, and the posterior to sensation, it may be reasonably inferred that the intervertebral nerves of the head, now shown to be analogous to these, are also analogous in faculties; but to what extent certain of the cerebral nerves agree with the former species of root, and to what others agree with the latter, we are informed by minute anatomical investigation.

Arnold is then led to make a very near approach to what we ever have regarded, and must continue to regard, as the true use of the nervous chords, in observing that, by means of the nerves of the head, the dynamic conjunction of the brain or cerebral portion of the nervous system, with the external parts of the head, the lungs and the stomach, is directly accomplished;—and, in accordance with this principle, he distinguishes the extremity, vulgarly called the origin, as the cerebral part or end of the nerve, and the other according to the parts with which it is connected. The cerebral nerves at once convey to the mind the objects of perception and complete sensation, and they propagate the acts of the brain to the organs, and excite motion. The different functions performed by different nerves depends at once on the difference of nature, on the peculiar condition of the parts of the brain, and on the peculiar nature of the external organ; and hence, a difference of function is observed to be associated with differences in structure. Thus the genuine nerves of the proper senses differ in structure from each other, and from the fifth and tenth pairs; and the motiferous nerves do not agree in structure with the sensiferous. In short, each part of the brain is, in its own nature, allied either to sensation or to motion, and communicates the one character or the other to the nerves attached to it. Lastly, all the organs bear in their nature an ultimate relation to one or other class of cerebral actions.

The more varied the relations of each part of the body are to the mind, the more numerous are the pairs of nerves; and the more important the organ is, the more varied are the nerves in origin and nature. The importance and number of the nerves of the head, correspond to the importance and number of the parts of that region. The brain and *cranium*, which from the first present the type of the spinal chord and *vertebræ*, are so voluminous in the human body, that the individual parts of one nerve are kept separate in origin and course, and, therefore, the scull and brain present many nervous trunks, the primitive form of which is understood only by the penetrating inquirer.

In order to understand well the constitution and nature of the nerves of the brain, M. Arnold represents attention to the following circumstances to be requisite.

I. To the three superior organs of sensation are appropriated peculiar individual nerves, which belong to one and the same class. The first pair, or the olfactory, the second, or optic, and the eighth or acoustic, are denominated GENUINE, TRUE, OR PURE NERVES OF SENSATION.

II. The other pairs of cerebral nerves present in formation the type of the spinal nerves, and are to be denominated INTERVERTEBRAL PAIRS. Admitting only three *vertebræ* in the *cranium*, it is manifest that between these can issue only two other intervertebral nerves, an anterior and a posterior, which, however, by reason of the variety of the parts of the head, and the size of the brain, are separated into several individual trunks.

III. The third pair, the sixth and the twelfth pair of nerves, rise from the base of the brain in the same manner as the anterior roots of the spinal nerves; the fifth and the tenth pairs in the same manner as the posterior roots; while the seventh and the ninth pair hold an intermediate place between the two. The fourth pair, the small portion of the fifth, and the eleventh pair are distinguished in their origin from the motiferous nerves.

IV. Most of the trunks of the intervertebral nerves emerge by the intervertebral holes of the head, viz. the superior orbital fissure and the *Foramen lacerum* in the base of the *cranium*, or temporo-occipital fissure. Through the former emerge the third pair, the fourth, the sixth, and the ophthalmic or first branch of the fifth. Through the latter pass the ninth pair, the tenth or pneumogastric, and the eleventh. The round and oval holes of the sphenoid bone, which are appropriated to the second and third branches of the fifth pair, and the condyloid hole, which is devoted to the tenth pair or hypoglossal, belong to the intervertebral holes, from which they are separated according to our author, solely because the scull has attained a form conformable to the brain and nerves. The tenth pair observes a peculiar course in the temporal bone, in consequence of its intimate connection with the auditory nerve, and the auditory nerve and the organ of hearing.

V. The intervertebral nerves are so distributed, that the anterior is subservient to the motions of the face, and sensitive life, and the organs comprised in it; while the posterior pertains to the pneumogastric system, the tongue, the *pharynx*, *œsophagus* and stomach, the *larynx* and the lungs. The tongue being the organ of taste, speech, and deglutition, is provided with branches from both intervertebral nerves. The muscles of the orbit are endowed with three separate nerves, rising from different parts of the brain; because from the eye the mind is reflected, by this organ various affections are evinced, and without motion the eye is void of all animation and energy. To the muscles of mastication is distributed the *nervus masticatorius*, or small portion of the fifth pair; to the muscles of the face, the facial or seventh pair; to the integuments of the countenance, temples, and neck, and to the mucous membrane of the nostrils and mouth, the large portion of the fifth pair and the small portion of the seventh are appropriated. The glosso-pharyngeal nerve is the peculiar minister of the *pharynx* and the root of the tongue, and the pneumogastric nerve holds the sovereignty of the *larynx* and windpipe, the *œsophagus* and stomach. The eleventh pair moves the internal muscles of the *larynx*, and some muscles of the neck, by which we expire deeply. The twelfth pair is aptly denominated the motiferous nerve of the tongue, or the nerve of articulate speech, since its branches are distributed to the muscles of that organ and the *os hyoides*.

VI. In their course, several nerves of the brain form communications both with each other, and with the nerves of the neck, and with the upper divison of the sympathetic nerve, because these nerves either are distributed to one and the same part, or they contribute mutually to form a series of sympathies common to one part of the body, or by union they form intermediate organs. Thus the fifth pair and the seventh, the lingual nerve and the hypoglossal, are united variously; the upper filaments of the system of ganglions, and the cerebral and cervical nerves are connected; the nerves from the cervical ganglions form with the nerves of the brain and neck, ganglions which belong to both systems of nerves;—as the ophthalmic, the nasal, maxillary, petrous and pneumogastric ganglions, the four first of which belong to the organs of the senses, while the others constitute an intervertebral tribe of ganglions of the head.

Such are the chief principles and distinctions to be kept in remembrance in the course of studying the anatomy of the nerves of the head and face. The whole of these principles and distinctions are not entirely new; for our readers are aware that they were inculcated and illustrated, as to the fifth and seventh pairs of nerves, by Bellingeri and Sir Charles Bell; and as to the spinal nerves, by the latter author and Magendie, and some other authors. To Arnold, however, belongs the merit, if merit there be, in applying these distinctions to the nerves of the head generally, and in producing an extensive general system of arrangement, according to physiological principles, of all the nerves of the head and face. In making this application, therefore, M. Arnold is unquestionably original.

It is impossible to doubt that this method of arrangement and distinction exhibits a much clearer and more intelligible view of the system of the nerves of the head than any yet given to the physiological world. They present a greater degree of order and generalization than can be obtained by any other method, in so far as they associate, by certain general principles, the organs to which nerves agreeing in structure and disposition are distributed. These views are still more beautifully illustrated in the accurate delineations published by M. Arnold.

Thus we find the third pair consists of two parts, a motiferous and a sensiferous, or gangliophorous portion, the latter being the portion which is distributed to the iris, and which, with the fifth pair, forms the ciliary nerves.

Of the seventh pair, or the communicating of the face, we find he traces the two parts of the cerebral extremity, to the posterior margin of the annular protuberance, and the upper part of the restiform body, and to the margin of the auditory nerve, which, indeed, is also the superior part of the restiform body. It is impossible to overlook the physiological uses of this mode of connection of its cerebral end with the brain; for though this nerve is doubtless one which performs many voluntary motions, and thereby gives proof of its connection with the protuberance, it is, nevertheless, to be observed, that it gives rise to an extensive series of instinctive actions, and that, in its distribution and communications, it is connected with organs not exactly under the influence of the will; and hence the reason of its connection also with the restiform bodies. It is also important to observe, that, as the sense of hearing is connected with the developement of many of the motions of the face, and with many emotions and feelings expressed in the face, the connection of the acoustic nerve with the seventh pair is also a necessary circumstance in the arrangement of the cerebral nerves.

We may mention when on this subject, that we have in the fifth engraving a most beautiful and distinct view of the *ganglion oticum*, or auricular ganglion.

Of the ninth pair, or glosso-pharyngeal nerve, the cerebral extremity consists of two parts,—a larger or posterior, and a smaller or anterior, both connected with the restiform bodies. The connection between the filaments of this nerve and the tympanal cavity and Eustachian tube above, and the *pharynx* and tongue below, and with the *nervi molles*, is well displayed in the sixth engraving.

Of the tenth pair, or pneumogastric, we must not speak, because it would lead us into a field too extensive and complicated.

The twelfth pair, or hypoglossal, is the nerve, according to Arnold, of articulate speech. The trunk and descending branch only of these nerves are represented.

We ought not to omit to mention, that in the seventh plate is a correct and beautiful view of the ramification and distribution of the branches of the fifth pair, especially the inferior maxillary and its ganglions, while the general distribution, and especially the dental branches of the fifth pair, are very beautifully represented in the eighth plate.

In conclusion, these engravings, which are not only very accurately and beautifully done, but upon a new principle of arrangement, ought to be carefully studied by all those who wish to understand the neurotomy and neurology of the head. They reflect great credit on the author as an anatomist of great accuracy, and a physiologist of great originality.

ART. VII.—*Elements of Chemistry, including the recent Discoveries and Doctrines of that Science*. By EDWARD TURNER, M. D., F. R. S. L. & E., Sec. Geol. Soc., Professor of Chemistry in the University of London, &c. &c. Fifth Edition, enlarged and carefully revised. London, 1834. 8vo. Pp. 1065.

WE believe that the history of literature presents very few examples, indeed, of an elementary work on a branch of abstract, though interesting science, passing through so many editions in so short a space of time. Within the space of little more than seven years from the time at which the present work first appeared, it has attained its fifth edition; and, as we have good reason to know, that the impressions were large, the circumstance must be regarded as a pretty decisive proof of the intrinsic excellence of the work.

It gives us, indeed, great pleasure to remark, that the opinion which we delivered at the first appearance of this work, on its merits as a didactic treatise, in which condensation was happily combined with clearness and comprehensiveness, has been confirmed by the judgment of the chemical world, and that the expectations in which we were led to indulge, have been completely realized by the general approbation of the public, not only in this country, but in the more extensive field of the United States of America. Of the two last editions, new impressions of very great extent have been prepared in Philadelphia, with as great rapidity as the work was brought forward in this country.

Of a work honoured with marks of approbation so unequivocal, it is almost superfluous for us to speak in the mere language of general commendation. On the appearance of the first edition, we recommended the work as the best elementary treatise on chemistry in the English language; and in every subsequent edition, the author has exerted himself with the most indefatigable diligence, and with great judgment and success in rendering this character strictly applicable to his work. The frequent call for new editions has enabled him to introduce all those discoveries and rectifications which the rapid progress of chemistry and its collateral branches is daily making known; and the extensive and accurate knowledge of the author, with the part which he takes in many of the departments of analytical chemistry, has enabled him to make these additions and improvements with peculiar advantage, and in such a manner as to communicate the requisite information, without adding inconveniently to the size of the volume. It is impossible for any one who is not intimately conversant with the daily history of the annals of chemistry, to frame an adequate idea of the great difficulty and arduousness of this task. For so multiplied are the new facts daily collected, so complicated is their mutual influence, and so varied are the modes of explaining them, that it requires the most indefatigable diligence to keep on a level with the progress of discovery, and the most perfect acquaintance with the resources of experimental chemistry, to be enabled to appreciate the respective merits of each speculation.

In the present edition, besides this uniform study to present an accurate view of the present state of chemical knowledge, we find the author has found it requisite to make several changes and additions. In the first part of the work, devoted to the consideration of imponderable substances, we find the section on Light augmented by a neat and instructive summary of the laws of Reflection and Refraction. The section on Electricity has been entirely remodelled and much improved by the additions of the results of the researches of Mr Snow Harris.

Those of our readers who take interest in watching the progress of physical science are aware that since the publication of the last edition of this work, Mr Faraday has given almost a new character to the science of galvanism, and, by researches of great accuracy and originality, has exposed numerous errors, and unfolded views of the nature of that action of the highest interest and importance. Of the papers of that distinguished chemist, which occupy a large proportion of the Philosophical Transactions for 1833-34, Dr Turner presents in the present work, a faithful, luminous, and instructive abridgement, to which the student and practical galvanist may refer with confidence for explicit and satisfactory information.

In the last edition the reader is aware that chemical symbols, which were excluded from the first part of the volume, were introduced into the second part. In the present edition, the author, having found it requisite to adopt them more generally, has given in the chapter on Combination, an account of the method of employing this species of abridged language.

To the medical reader, the most interesting part of the volume is that on Organic Chemistry, not only from the light which it throws on the departments of animal and vegetable physiology, but from its connection with some of the most important agents in the Materia Medica. This division of the work, however, necessarily demands the largest share of the study and diligence of the author, not only from its inherent difficulty, and the numerous sources of fallacy to which the analysis of the processes and products of organization is liable, but from the great number of inquirers by which it is cultivated, and the frequent changes and modifications to which its facts are liable. The manner in which these difficulties have been overcome in this division of the work, we have always regarded as the best proof of the ability of Dr Turner as a didactic writer; and we are happy to observe that he contrives to sustain this character in the present edition. While the work exhibits a full and accurate view of the present state of chemical knowledge as to facts and doctrines, it is not less valuable to the medical reader in presenting in short compass a most just and instructive view of the present state of knowledge on the chemical constitution of organic bodies.

In conclusion, this work possesses every qualification, in point of methodical arrangement, condensation of materials, correct statements of facts and theories, and perspicuity and simplicity of style, which can render it valuable as a didactic elementary treatise, and, as such, deserves the strongest recommendation which can be given to the general as well as to the medical reader, to the cultivator of physical as well as of chemical science.

ART. VIII.—*An Introduction to the Study of Human Anatomy.* By JAMES PAXTON, Member of the Royal College of Surgeons in London, &c. With numerous Engravings. In Two volumes. Volume II. London, 1834.

THE present volume, completing the work of Mr Paxton, deserves some notice for the same reasons for which we introduced the first volume to the attention of the readers of this Journal.

It forms a succinct and methodical digest of anatomical knowledge, not, indeed, very minute, but sufficiently clear to communicate in general just ideas on the structure of the human body.

The present volume, beginning with the completion of article fifth, viz. the subject of the veins, contains ten articles devoted to the following subjects in the order specified.

The sixth article, devoted to the organs of absorption; the seventh to the nervous system; the eighth to the organs of sensation, particular, cutaneous, muscular and visceral; the ninth to the organs of digestion; the tenth to the organs of respiration; the eleventh to the organs of the voice; the twelfth to the organs of secretion, composing the conglomerate glands; the thirteenth to the organs of generation in the male, and the fourteenth to the same organs in the female; the fifteenth to the anatomical peculiarities of the fœtus; and the sixteenth to the anatomical structure of the nervous system and the cellular tissue.

It comes not within our plan to enter into minute criticism of a work like the present. It is sufficient to say, that the author gives on the whole, correct general ideas on the figure, position, and structure of the different organs, and explains as fully as can be expected in a work of the kind, the anatomical facts requisite to convey some idea of the uses of the parts.

The work is nevertheless not free from faults and oversights, which might have appeared even more numerous if sought for. Those which we have observed were presented casually. Between the representation of the spleen in p. 242, and the usual figure of that body, we cannot recognize much resemblance. The *pancreas* is larger in appearance than it usually is found; and the section exhibiting the structure of the kidney presents the tubular part too strongly marked.

Some inaccuracies in terminology, we should not have expected to find in the present work. The word *dermis* has no existence unless in the pages of Mr Paxton. The proper Greek name for the *cutis vera* or corion is *derma.* Corion is erroneously printed chorion.

The delineation of the olfactory nerves in p. 84, is repeated in p. 162, fig. 55, without any good reason.

ART. IX.—*The Elements of Anatomy.* By JONES QUAIN, M. D., Professor of Anatomy and Physiology in the University of London. Third Edition, revised and enlarged. London, 1834. 8vo. Pp. 870.

OF the nature and contents of this work we gave some account at its first appearance in 1828, in our thirty-first volume, Since that period the work has passed through a second edition, and is at present before us in the third.

The present edition is certainly very much improved, and gives evidence of having been subjected to patient and careful revision.

The author does not confine himself to the task of mere descriptive anatomy, but, as in the former editions, gives physiological remarks, pathological observations and reasonings, and in several places, more or less minute information on surgery and surgical anatomy.

Though some of these topics may occasionally have an extraneous and adventitious appearance in a treatise on anatomy, we are happy to remark, that, in the present work, they are so dexterously and seasonably introduced, that they constitute useful additions. They are, indeed, the practical applications of the anatomical principles unfolded by the author; and not only enliven the dulness of mere anatomical description, but, by directing the attention of the student to the purposes of his anatomical knowledge, cannot fail to be both interesting and instructive.

This work may be, in short, recommended for giving a very just view of the present state of anatomical knowledge, and putting the English student in possession of the most important points of information contained in the best continental treatises. It constitutes further a very valuable and useful guide to the dissecting-room, by the number of specimens which it contains of the descriptive anatomy of the parts as they are brought into view. Of this kind the directions for exposing the different important arteries, and the parts concerned in the production of hernial tumours, are done with very great clearness and ability.

Art. X.—*Pathological and Practical Researches on the Diseases of the Brain and the Spinal Chord.* By John Abercrombie, M. D., Fellow of the Royal College of Physicians of Edinburgh, &c. and First Physician to his Majesty in Scotland. Third Edition, enlarged. Edinburgh and London, 1834. 12mo. pp. 457.

The present, which is the third edition of the work reviewed at considerable length in our twenty-ninth volume, (p. 329,) is a portable form of that work, chiefly for the accommodation of students.

Though the arrangement and the great mass of the materials are quite the same, the author has added a considerable number of additional facts and observations on various diseases of the brain and spinal chord. In the outline on the diseases of the nerves we also find some additional matter.

These changes now specified have not only augmented the value, but must tend to extend the utility of the work of Dr Abercrombie on this important tribe of diseases. The treatise will form a very valuable work of reference to the student and country practitioner.

Note of Explanation regarding a mistake committed by M. Velpeau in regard to the occurrence of Convulsions in Puerperal Females in the practice of Dr Merriman. Vol. xlii. p. 428.

Our attention has been directed by Dr Merriman of London to an erroneous statement made by M. Velpeau regarding the comparative frequency of convulsions represented to have occurred during the puerperal state in the practice of that gentleman. M. Velpeau states, at p. 19 of his treatise, that forty-eight cases of convulsion had occurred in the course of ten thousand cases of delivery in the practice of Dr Merriman; and in the list of *errata* he afterwards rectifies this statement, and makes it forty-eight cases of convulsion in the course of only two thousand cases of delivery.

We had at the time no means of knowing whether this statement were correct or not, and consequently gave it on the authority of M. Velpeau, not doubting that this author, from the express correction in the list of *errata*, had taken pains to ascertain the accuracy and authenticity of the statement. The statement has attracted the attention of Dr Merriman, who has, accordingly, addresed to us the following letter, partly with the view of rectifying the error, and partly with the intention of explaining the principles according to which the proportional frequency of convulsions during pregnancy, labour, and after parturition, may be determined.

Though the statement has not proceeded from any error of ours, and though we cannot be responsible for the accuracy of statements made by authors of works reviewed, we have great pleasure in affording Dr Merriman an opportunity of making the requisite rectification; and we take this opportunity of saying, that we feel obliged to Dr Merriman for the polite manner in which he has directed our attention to the erroneous statement.

"Sir,—From the very full and lucid review which you have published in your last number of M. Velpeau's excellent and scientific treatise on puerperal convulsions, I learn that he has very incorrectly stated the result of my experience in that malady; for it is mentioned at page 428, that 48 cases of convulsions had occurred to me in 2000 labours, giving the enormous amount of one case of convulsion in every forty-two labours,—an amount altogether incredible and impossible.

"The error into which M. Velpeau has fallen, originated probably from his confounding together two tables in my work, which ought to be kept distinct. In treating upon convulsions, I have inserted at page 147 of my 'Synopsis of the various kinds of difficult Parturition, &c.' 4th edit. 1826, a table of the results of forty-eight cases which I had attended, 'either in *private* practice or in *consultation*.' Now, the *consultation* cases, amounting in number to forty-three, arose as follows: *1st*, From my holding the office of obstetric physician to three public institutions, viz. the very large parish of St George, Hanover Square; the Westminster General Dispensary; and the Middlesex Hospital: *2dly*, From being frequently called in consultation in these serious cases by my professional brethren.

"Now, though it would have been possible for me to give the averages of the practice at the Westminster General Dispensary and the Middlesex Hospital, yet I could not obtain correct averages from the patients of the parish, nor from the cases to which other practitioners called me; and, therefore, I only gave the result of the forty-eight cases I had witnessed, without attempting to draw any average from them.

"But in another part of the book, page 335, I published a 'statement of the presentation of the child in 2947 cases of parturition in *private* practice, with the accidents, deaths, &c. which happened in the whole number;' and this, I am confident, is executed with as much accuracy as can possibly be obtained. It includes the whole amount of cases which I *had been engaged to attend* during the first thirty years of my professional life. It included my earliest, mostly guinea, patients, and those who were intermediate, till I came at length to attend patients in the highest ranks of life.

"Among these 2947 labours, five only were complicated with puerperal convulsions, which gives the average of 1 in about 588 cases. When this is compared with the result of Madame La Chapelle's immense body of cases, the coincidence between the amount in Paris and London is curiously exact, Madame La Chapelle averaging 1 in 556.—I remain, &c.

34. Brook Street, Grosvenor Square, SAM. MERRIMAN."
November 19, 1834.

In a subsequent communication, Dr Merriman states, after we had again requested his attention to the matter, with the view of procuring exact numerical proportions among a great number of cases of delivery,—that, though it would now be difficult, if not impossible, to obtain exact averages at so remote a period of time, he believes that the average he has given from his own practice is nearly consonant to what has occurred in his public practice, and likewise to that of the public and private practice of most of the London practitioners.

PART III.

MEDICAL INTELLIGENCE.

CHEMISTRY.

Note on Creosote. By A. Buchner of Munich.—According to M. Reichenbach of Blansko, creosote ought to be prepared from the tarry matter of the beech tree by dissolving it three times in caustic potass, and setting it free each time by sulphuric acid. M. Buchner has procured it of the same purity from the tar of the pine, and has found that it is not necessary to repeat the operation so often if the following precautions be adopted.

1. At the first distillation of the tar, which is carried on in an alembic, the distilled liquid must be carefully removed several times, and the recipients changed. At first, eupione comes over, which swims on the water, but as soon as a little of the oil sinks to the bottom, it is formed in a great part of creosote, and the distillation is to be continued until the residue is of the consistence of black pitch.

2. The oil, which is heavier than water, is to be agitated with a little concentrated sulphuric acid, to separate the ammonia and favour decoloration.

3. It is then to be mixed with its volume of water and distilled in small retorts.

4. The distilled liquid which is formed at the bottom of the water, consisting in a great measure of creosote, is to be dissolved in hot caustic potass of the specific gravity of 1.120, after which it is to be left for some time to settle at a slow heat. If there be any eupione, it will float on the surface of the liquid, and must be carefully removed.

5. After the cooling of the alkaline solution, a slight excess of sulphuric acid is to be added, which will set free the creosote.

6. The creosote separated from the sulphate of potass is to be distilled anew, in small retorts, taking care, as in the first distillation, to reject several times what comes over. The distillation advances slowly at first, and is attended with violent agitation, in consequence of the presence of water. Thus, the first portion which comes over consists only of water and a small quantity of eupione, which must be rejected. The residuum is a brown mass.

7. If the creosote thus obtained be distilled two or three times without any addition, it will be found sufficiently pure for medicinal purposes.

Creosote ought to be colourless, and possessed of great refrangibility of blue and yellow, of the sp. gr. 1.037 at 20 C. (68° F.); and its alcoholic solution, when mixed with water of barytes, does not become brown in the air. It boils at 203 C. (397.4 F.), and distils without any alteration. It possesses a very peculiar odour, which is something like a mixture of the odour of smoked meat and castor. In its general properties it resembles essential oils.

New Analysis of Cubebs. By M. Monheim.—One thousand parts contain, of ceruminous matter, 30; green volatile oil, 25; yellow volatile oil, 10;

cubebin, 45; balsamic resin, 15; chloruret of sodium, 10; extractive, 60; ligneous matter, 650; loss, 155 = 100. The ligneous fibres reduced to ashes yielded a considerable quantity of the carbonate and hydrochlorate of potass and soda.

Cubebin appears identical with piperin, and is found equally joined to a soft acrid resin. In this combination it dissolves in ether, alcohol, fatty oils, and acetic acid; but the solution of caustic potass, dilute sulphuric acid, and oil of turpentine, produced no action on the mixture. Heated with nitric acid it is coloured red.

Pure cubebin heated in a retort melts at 20 C. (68 Fahr.). At 30 C. (86 Fahr.) it begins to boil, and at the same time the greater part is volatilized in the form of white vapours, which are condensed in the receiver into a liquid of a thick consistence; an acrid taste like that of peppermint; of the specific odour of cubebs, and of a brownish yellow colour. At the temperature of 15 C. under zero (5 Fahr.) it is congealed. In the retort there remains only a small residuum of carbon.

On Lupinine.—M. Chevalley de Rivaz having observed at Naples some intermittent fevers cured by the decoction of the *Lupinus terminis*, engaged M. Cassola to analyse the substance. M. Cassola first heated the meal of lupine with hot water, but the quantity of albuminous matter which it contained so coagulated the mixture that it was impossible to filter it, and alcohol at 40° (sp. gr. 0.936) was substituted. The mixture was boiled down to a very concentrated solution, filtered and evaporated to dryness. The residuum, which was of a beautiful yellowish-green colour, very solid, glossy, and transparent, was then dissolved in water, decolorized by animal charcoal, and evaporated to the consistence of syrup, when, at the bottom of the vessel, small white crystals, of no distinct form, were deposited. The whole liquid being evaporated to dryness, treated anew with dilute boiling alcohol, and again evaporated, the bitter principle of the lupine was obtained, to which M. Cassola has given the name of *Lupinine*.

Dried *Lupinine* is a solid substance of a slightly yellowish colour, having at the moment of its formation the transparence and fragility of gum-arabic; but scarcely is it cooled, if left a little exposed to the air, when it slowly melts, and takes on a syrupy consistence. Its taste is excessively bitter, like that of the lupine. It is soluble in water as well as alcohol, at 40° (0.936) but insoluble in ether, as well as pure alcohol.

If the *Lupinine* be touched when it is of the consistence of honey, it sticks to the fingers like pitch. Exposed to the action of fire, it melts like wax. However, neither this circumstance, nor its solubility in alcohol at 40°, ought to make us confound it with gum. Concentrated sulphuric acid does not alter its colour; and neither the other acids nor potass react in a sensible manner on it. When a mixture of lupinine and nitric acid is heated, it becomes first of a slight yellow, then of an orange-yellow, and by degrees the two substances combine. If lupinine be heated in a close vessel, much carbonated hydrogen and carbonic acid is evolved, and an empyreumatic oil produced. If eighty or ninety grains be introduced into a tube containing a solution of caustic potass, a very sensible odour of ammonia is perceived. From these circumstances, M. Cassola believes himself justified in thinking the substance which he has discovered to be the bitter principles of lupine.

Experiments are at present making to ascertain to what extent it may be used as a substitute for bark and its preparations. It may be mentioned, that in some parts of the kingdom of Naples, the common people cure intermittents by a decoction of lupines.

On the Chemical Ingredients of the Brain, and their Changes in Disease. By M. Couerbe.—*(From the Annales de Chimie, Juin* 1834.*)* —In a memoir read in June to the Academy, M. Couerbe brings forward some new views on the brain, considered physiologically and chemically.

On submitting the cerebral mass to a microscopic examination, he discovered that it was composed of globules, those of the white being smaller than the gray. According to his analysis, the brain is composed, 1*st*, of a white fatty matter, to which he has given the name of *cerebrote ; 2d*, of a pulverulent yellow fat, *stearconote* from στεαρ fat, and κονις powder ; 3*d*, of an elastic fat *cephalote ; 4th*, of a reddish-yellow oil *eleencephol ;* and, in fine, of phosphorus, sulphur, osmazome, inorganic salts, and a large portion of *cholesterine*. All these substances were presented to the Academy by M. Couerbe.

In making a comparative analysis of the brains of idiots, maniacs, and sane individuals, he came to the following results, that the brain of a sane man contains from 2 to 2.5 per cent. of phosphorus ; that of an idiot, from 1 to 0.5 ; and that of a maniac, from 3 to 4, and 4.5

The following are his conclusions.

1*st*. The white fat matter differs from the gray, in the globules being smaller, and consequently that their functions ought to be different.

2*d*. That the brain contains a greater number of fats than had been supposed, and that these substances may explain a number of physiological causes.

3*d*. That softening of the fat matter may easily be explained, by admitting that *cephalote* may, under certain morbific influences, be transformed into *eleencephol*, a liquid substance isomeric with it, and capable of dissolving the other cerebral fats.

4*th*. That, contrary to the opinion, that cholesterine, which up to the present has been found only in small quantities in the bile, and still smaller in the blood, though in a larger quantity in biliary calculi, is a morbid production, it is a principal element in the nervous system, and appears to be elaborated by it.

5*th*. That cholesterine being found in abundance in the encephalon, may serve to distinguish cetaceous *mammiferi* from the human ; for the first present only an analogous substance very different from it in its chemical properties, that is *celine*.

6*th*. That phosphorus really exists in the cerebral substance, that is, fulfils, the functions of an organ or exciting element ; that it ought to be considered as performing a part among the most important perhaps of the nervous system, and consequently, in the whole economy.

7*th*. That all azotized substances are subject to particular laws, and that the vegetable alkalis appear to be dependent on them ; that in certain cases azote in organic substances plays the same part as oxygen in inorganic matters, so that we ought to admit the expression *azotide*.

8*th*. That the alkaline form would appear to be called forth *(provoquée)* by the formula, $C \quad H^{20} \; Az^2$ a formula which becomes the root of a certain number of alkaloids.

MATERIA MEDICA AND THERAPEUTICS.

New Process for Preparing Cantharides. By M. Piette. (*From the Bulletin General, July* 1834.)—M. Lucien Piette, an apothecary at Toulouse, recommends the following method of killing and preserving Cantharides. Put them into a wide-mouthed glass, or a glazed earthen vessel, and pour a small stream of oil of lavender, rosemary, or of any labiata, when the insects will soon die. They are then to be dried on a stove, or in the sun. Thus prepared, they preserve their beautiful green colour, with all the active principle. After being dried they have an agreeable odour, and may be preserved for some years without the mites attacking them.

Effects of Creosote.—Several physicians of Munich have put to the test the antiseptic desiccative and stiptic properties of this substance; and, if we may believe the journals, it has been used with the happiest effects in indolent, carcinomatous, and syphilitic ulcers, ringworm, itch, and caries. It is usually employed externally, pure or in a state of solution, prepared by diluting creosote with eighty parts of water. To obtain a more concentrated water of creosote. a gros (59.1 Troy) of this substance is dissolved in two ounces of alcohol, and a few drops of the solution added to the water till it becomes opaque. It is highly useful in arresting caries of the teeth. Internally, it has been used in dysentery by Reichenbach, who is of opinion that the inhalation of the vapour would be advantageous in suppurations of the trachea and bronchial tubes. From the experiments of several physicians at Munich, it would appear that its action is only topical, and that it is not absorbed. In one experiment, the carotid artery of a dog was cut through, and the bleeding was stopped by pressing it with the finger. The blood did not flow, and the wound healed in a few days without a bandage. Is this credible?

PATHOLOGY.

On Tubercles in the Placenta and Uterus in a Phthisical female. By M. Hardy, Intern of the Hospitals, (*From the Archives Generales, June* 1834.) —On the 1st of January 1832, Marie Nolet, a washerwoman, 35 years of age, presented all the signs of pulmonary *phthisis*. She said that she was six months pregnant, and distinctly felt the infant move. On the 6th, she died. Immediately after her death the Cæsarean operation was performed with a view to save the infant, but it was found dead. The body was examined next day. The lungs adhered strongly to the pleura. Numerous softened tubercles were found in the anterior and superior parts of both, near which caverns existed. The right lung, besides, presented evident signs of sanguineous congestion, and appeared increased in size. The liver had not the appearance which it usually presents in phthisical patients, but was nearly of its usual colour and volume. The spleen was smaller than in a healthy state, and neither in it nor the liver were tubercles found; such, however, was not the case in the *uterus* and *placenta*.

On its external surface the *uterus* presented a considerable number of small projections under the *peritoneum*. On cutting into them they were recognized as tubercles in a crude state. None appeared in the interior of the tissue nor on the internal surface of the womb. Tubercles have frequently been met with in the *uterus* in *phthisis pulmonalis*, but authors have not mentioned their being found in the *placenta*.

In this case eight or ten were disposed here, and those on its uterine surface. Some were as large as a pea, two had almost the bulk of a filbert; they were of a whitish colour, and pretty resistent. They might have been taken for scirrhous tissue, if the coexistence of tubercles in the lungs, *uterus*, and the same organ had not shown their connection with this latter species of morbid production.

On examining the fœtal surface of the *placenta*, a great number of small miliary tubercles covered by the *amnios* were felt by the finger.

The organs of the fœtus were all healthy, and exhibited no traces of tubercles.

The Bones of Cancerous Subjects not Friable.—At the comparative trial of the candidates for the chair of Clinical Medicine at Paris, 28th June, M. Lisfranc took occasion to correct the error of those authors who have asserted that cancer renders the bones friable.

During fifteen years he has given courses of operative surgery, and has frequently been furnished with the bodies of cancerous females. Instead of the bones being dry and easily broken into splinters, he has found them softer, moister, and more engorged with fluids than in the healthy state, and three strokes of the saw were sufficient completely to divide the largest.

Case of Fragilitas Ossium. By M. Roberty, Intern of the Venereal

Hospital.—*Archives Generales, July* 1834.)—Josephine Thevenot, aged 25, well made and hitherto healthy, married at 17, and had a daughter who enjoyed perfect health. In September 1833, she came under the care of M. Boyer, at the Venereal Hospital, for a blennorhagic discharge from the vagina and some vegetations situated on the mucous membrane of the *vulva*. According to the patient's account, the disease was recent, and had been communicated to her by her husband. Emollient applications were used, and the vegetations excised, and she left the hospital in a few weeks, without the discharge, however, being entirely dried up.

On the 29th of October 1833, she returned to the hospital, and was placed under the care of M. Cullerier. The discharge had stopped, and no symptoms of disease appeared about the genital organs. An affection, however, apparently more severe, induced him to keep her in the hospital. Before being affected with *blennorhagia*, she began to feel general fatigue in all her limbs, which was increased by the least exertion. To this succeeded pains, at first slight and wandering, but which afterwards became more intense, and appeared to fix themselves principally in the thighs, occupying their middle, and spreading thence over all the regions of the body. On her first entrance into the hospital she did not complain of them, but after she was dismissed her sufferings increased; and, by the assurance of several physicians that they were of a syphilitic nature, she was induced to return to the Venereal Hospital in October 1833. At first the patient was able to walk a little, supporting herself against the walls and beds of the ward. In walking the motion was very painful, her knees approached and even knocked against each other,—a phenomenon which has been observed in fractures of both necks of the femur. She was soon forced to keep her bed; the inferior extremities did not exhibit any unusual mobility or shortening; the superior extremities and the trunk enjoyed their ordinary mobility.

The disease was believed to be an affection of the spine; but the treatment adopted in consequence, far from relieving, increased her sufferings. Long lying produced an eschar on the *sacrum*, and the patient was cut off by the fatigue of the discharge and suppuration from it.

Four days before her death, on the 29th of March 1834, in attempting to remove her for the purpose of arranging the sheets, the left thigh was fractured about the middle third. No apparatus was applied.

On examination no trace of disease was found in any system, except the osseous, which presented the following appearances:—All the bones preserved their usual size without any swelling or tumour, but they were about a third of their ordinary weight, and more flexible than in a normal state, and easily broken when bent too much. The long bones were fractured with the slightest efforts, and the fractures thus produced were comminuted, the fragments presenting numerous asperities. The osseous tube appeared to be torn rather than broken. A great deal of blood flowed from the fractured surfaces. The fracture of the *femur*, which occurred during life, presented the same characters. This softening and fragility was met with in all the bones without exception, but especially in the *femurs*, legs, *pelvis* and *vertebra*. The *periosteum* which covers these bones was detached with great facility, and drew with it the prolongations which accompany the vessels into the osseous tissue. On compressing one of the bones blood oozed from a number of small openings. The blood-vessels of the bones were of a considerable size. All the bones were of a deep-red colour, and were easily cut into by the scalpel, but there was none of the gelatinous carnified matter described by authors. The proportion of the phosphate of lime was less than usual. On raising the *periosteum*, a layer of osseous tissue was found about half a line in thickness, which seemed almost reduced to dust and disorganized. Under this layer the osseous tissue presented, especially in long bones, structure of longitudinal fibres, which might be separated to a certain point from the cellular tissue and vessels,—a circumstance which appears to confirm the opinion of Albinus. The layer of cellular tissue which was in contact with the medullary membrane was in the same state as the internal layer. The medullary cavity in the long bones was considerably increased, so that at the middle of the thigh the osseous cylinder was scarcely a line thick. It was filled with a very thick medullary substance like pap, of the colour of wine and chequered with yellowish granulations. The medullary membrane was infiltrated with blood, and thickened. It was easily separated from the osseous tissue, and drew with it the vascular filaments, adhering to that tissue. In the short bones, and in the extremities of the long bones, where the medullary membrane is represented only the cellular lamellated tissue, which accompanies the blood-vessels, these alterations were less distinct. The necks of the *femurs* had entirely disappeared, and the head of the bone was attached to the body, only by the articular fibrous capsule.

SURGERY.

Excision of the Scrotum, enlarged and indurated to an extreme degree.— In August 1833, two remarkable operations were performed by Clot-Bey, in the Marine Hospital of Alexandria. The disease was the same in both, viz. elephantiac tumour of the *scrotum*, but accompanied by circumstances which tended to embarrass the operation. We shall give a brief abstract of the cases, and the operator's remarks.

Abou-Kher, born at Alexandria, aged 26, a mason, of a good constitution, had been affected from his sixteenth year, with inguinal hernia of the left side, which had never been reduced. About two years previous to his coming under the care of Clot-Bey, a venereal bubo was developed on the left side, but soon disappeared by local treatment. The *scrotum*, however, of the left side began to increase in size, and an Arab surgeon was consulted, who detected a hydrocele, which he punctured with a lancet, and evacuated some ounces of fluid. A smart inflammation which followed, yielded to emollient applications, but the tissues of the *scrotum* remained in a state of indolent induration, which gradually increased, till in about two years it was 21 inches in circumference, and 10 inches long from the pedicle to the summit. The skin which enveloped the tumour was of a reddish-brown colour, marked with *rugæ* and crumpling, analogous to what is observed in elephantiasis of the extremities.

On the 18th of August Clot-Bey proceeded to extirpate the tumour. The hernia was first reduced, and retained by an assistant. A semicircular incision was then made, commencing at the anterior and middle part of the *pubis*, traversing the left lateral portion from above downwards, and terminating at the perineum, on a line with the *raphe*. A like incision in the same direction was made on the left side, and the two lateral flaps were isolated from the tumour. The orifice of the *urethra* was then circumscribed by a flap cut in the form of a rhomb. The penis was disengaged from the tumour, and covered with the skin with which it was formerly covered, and which the weight of the tumour had drawn in front of the glans, and transformed into a canal, after which the superior extremity of the elliptical flap was brought against the *pubis* in the angle formed by the union of the two lateral incisions.

To discover the left spermatic cord and its testicle a deep incision was made in the direction of the mass of the tumour, when the operator discovered a hydrocele and evacuated its contents. He then opened the hernial sac, which was considerably distended, but did not communicate with the cavity of the *tunica vaginalis*. He opened it till within an inch of the ring, brought in contact the inner walls of the sac, and kept them united by a flap suture, with the aid of a thread, by which they secured the ends without tying them. The hernia thus reduced did not require an assistant to retain it. The operator passing to the right side discovered in the same way the cord and its testicle, along with a second hydrocele, which he treated like the first.

The *penis*, spermatic cord and testicle being isolated, turned back and retained in the *pubis*, the tumour was rapidly detached, and after tying two branches of the pudic, the two great lateral flaps destined to serve as a new covering for the testicles was brought over them and united at various points by suture from the *perineum* to the base of the *penis*, and the superior flap was fixed in a similar manner. The application of lint and compresses completed the operation.

On the 19th the dressings were penetrated by a sero-sanguinolent liquid, and the general health was satisfactory. On the 20th, the skin was hot; the pulse rapid; thirst; and little sleep. 21st. Dressings completely soaked; some points of the suture below the penis were detached to give vent to some clots of blood; fever; decided thirst. 22d. Other parts of the suture were cut away to give passage to new clots of blood; fever; great thirst; tongue whitish; one alvine evacuation. 23d. The dressings still soaked with serosity of a gangrenous odour. On removing them, the wound appeared mortified in some points; the general health the same. In the evening, abundance of serosity; the gangrene had invaded the epididymis and part of the *tunica vaginalis*, which were excised; slight cough; no sleep. 24th. The gangrene had penetrated the whole substance of the testicle. Clot-Bey detached it after tying the cord; the general state the same; cough the same; a little sleep. In the evening some gangrenous portions of the cellular tissue were excised; nausea; vomiting; little sleep. 25th, The gangrene was limited; the appearance of the wound better; the fever, cough, and thirst less, and some hours sleep. In the evening the wound was ruddy; a stool; cessation of the cough; little fever. 26th, Sleep; appetite; detachment of the ligature of the chord and of the hernial sac; the edges of the flap appear somewhat gangrenous, and were excised; suppuration abundant and healthy. 27th. Suppuration healthy. 28th. In the same state; a tendency to fever towards evening. 29th. Suppuration less abundant. 30th. The wound looks well; adhesion in various parts. The wound cicatrizes rapidly. The medical treatment consisted of low diet and acidulated drinks.

In his remarks, Clot-Bey states, that in three months he had extirpated five elephantiac tumours of the scrotum, of which the one just narrated was the most severe; and, notwithstanding its size, its being the consequence of a venereal affection, and complicated with hernia and double hydrocele, it was cured in almost as short a time as the others. The success which attended his attempt at permanently curing the hernia by passing a ligature round the sac, encouraged him to recommend it in the other cases. Although it was in this case necessary to cut away the sac, he is of opinion that it is superfluous in simple hernia, and that, if the gut be reduced, and the mouth of the sac obliterated, the inner surface will then contract adhesions.

In the next case the tumour weighed eighty pounds, and it was necessary to perform castration. The particulars are as follows:

Abdraah-Man, a native of Rosetta, a weaver, though of a feeble and lymphatic constitution, was free from all disease till his twenty-second year, when he had frequent attacks of intermittent fever, which terminated in tumefaction of the left leg and scrotum in the same side. The swelling of the scrotum increased little during the first two years, but in the two years which followed, it became enormous. One particular circumstance attended the progress of the disease. When the attacks of intermittent fever were suspended, the tumour increased in an instantaneous and almost visible manner.

During the nine years he was married he had only two children; and his wife did not become pregnant after the appearance of the tumour. No member of Abdraah-Man's family had ever had the disease. His meals were frugal, like those of the other Arabs, and he had never abstained from these daily ablutions of his genital organs enjoined by his religion.

On the patient's entering the hospital, the tumour was irregularly rounded, 20 inches long, and as many broad, and its circumference was 40 inches. It extended below the knees to the middle of the leg, and its mass was so great, as to deprive the patient of locomotion, and force him to keep his thighs asunder to the utmost. The integuments covering the pubis were in such a state of tension, in consequence of the weight of the tumour, that the penis was entirely covered, and the skin peculiar to it was drawn downwards and forwards, so as to form a canal opposite the mouth of the urethra. On both sides of the tumour, rents of a considerable size were observed. The legs and feet participated in the disease, and were infiltrated.

The operation took place on the morning of the 23d of August 1833. Clot-Bey wished to operate in the same manner as in the preceding cases, when he had restored to the penis its proper coverings, but the gangrene which had occurred in two of the other cases, induced him to cover a portion of the penis with its own integuments, and the rest with those of the pubis.

The patient being conveniently placed, the operator, with a convex bistoury, cut a square flap, partly in the integuments of the pubis, partly in those of the tumour. The operator detached the flap from the subjacent parts, except around the *corona glandis*, and searched for the testicles, that he might know their state. Finding them diseased, he extirpated them. He endeavoured, without success, to separate the spermatic artery from the cord; and, from the faintness, and almost constant syncope of the patient, he had to comprehend all in a common ligature, after which the tumour was detached with a few cuts of the bistoury. During the operation, a great quantity of venous blood was lost, but only one artery was tied. The integuments which had been preserved were cleansed of a great quantity of lardaceous matter, which adhered strongly to them, and the flaps from the perineum were united by a suture to the base of the penis, and all around it. The ligatures were kept fixed to the two sides of the pubis. The application of a simple dressing terminated this operation, which lasted twenty-five minutes, including the time employed in sutures and dressing.

An attentive examination of the testicles showed that their extirpation was justified. Their parenchyma was deeply altered, the *tunica vaginalis* on both sides had acquired a scirrhous consistence, and contained, especially the left, a considerable quantity of scirrhous pus, in which floated flakes of inorganic matter.

The weight of the tumour exceeded eighty pounds, without comprehending the lardaceous matter of which the integuments were relieved.

The state of the patient after the operation was as follows:—The first day general faintness; almost continual vomiting; and a small quick pulse. Second day, calm but sleepless night; vomiting; the tongue moist; the pulse stronger and more rapid; no pain or tension in the hypogastric region. Third day, two hours sleep; nausea; an abundant alvine evacuation; the dressing, soaked with sanguinolent matter, was renewed; the wound sufficiently healthy in appearance; the borders tumefied. From this time to the 30th matters went on well, except that some gangrenous points had to be extirpated, which left a part of the penis uncovered. The ligature of the cord caused no inconvenience, but was left only till the artery was obliterated.

Clot-Bey has given the name of elephantiac tumour to this disease, from its resemblance to elephantiasis, and because no other name which has been given to it is more correct. As to the origin of the disease, he is of opinion, that it arises from inflammation of the cellular tissue, similar to that which produces elephantiasis of the limbs, and which is always developed, like it, under the influence of inflammatory obstruction, characterised by fevers, gastric irritation, &c. In investigating the cause, he finds that the disease seems to be limited to Lower Egypt, and particularly to Rosetta and Damietta, where the two principal mouths of the Nile are situated. In these two places there is greater moisture than elsewhere, which is likely to form a great part of the occasional causes. To these may be added the cool winds which prevail on the borders of the sea, poor diet, the wide clothes, which leave the scrotum hanging, and exposed to continual friction, the abuse of cold water ablutions of the genital organs enjoined by Mahomedanism. The treatment consists, at first, in local bleedings, and the antiphlogistic regimen; but when the tissues are morbidly developed and transformed, all treatment except extirpation is useless.

We may here observe, that this enormous swelling of the lower extremities, connected with the scrotal enlargement, was well known to the ancients, and has prevailed in Egypt for a remote period of antiquity; and as such it is mentioned by Lucretius in the sixth book of his *De Rerum Natura*. It appears to be the same disease which has been described by Dr Hendy as prevalent in Barbadoes and other West India Islands, and of the formation of which Dr Musgrave of Antigua gave a very satisfactory explanation in the Twenty-eight volume of this Journal (p. 49), under the name of *Migratory Inflammation of the Lymphatic System.*

Of the extraordinary enlargement and induration of the scrotum and its cellular tissue, in connection with enlargement of the leg, a very distinct and instructive account is given by Dr Titley in his useful work on the Diseases of the Genital Organs of the Male, (p. 229.) Dr Titley gives a brief view of all the recorded cases, and of those especially in which the diseased parts have been removed by operation. Dr Titley gives a representation of a case of a negro, in the Island of St Christophers, in which, in December 1813, he removed a tumour of this kind, which weighed 70 lbs. Avoirdupois; and mentions shortly a case in which his friend Dr Caines removed a mass of enlarged scrotum weighing 50 lbs.; and three other cases in which he himself removed enlarged scrotums of various sizes.—See Practical Treatise, p. 316; and a Case in this Journal, xix. p. 566, by Mr Liston.

Plan of tying the Internal Mammary Artery. By M. BONNAFONT, Demonstrator of Anatomy at the Hospital of Instruction of Alger. (*From the French Lancet, August* 1834.)—The internal mammary artery is far from being beyond the action of external bodies. Placed at first behind the superior third of the posterior surface of the sternum, it diverges by degrees from it to run between the fibro-cartilages of this bone and the interval corresponding to the fifth, sixth, seventh, and eighth ribs, where it is distant almost an inch from the external border of the sternum. Placed immediately on the pleura, covered by the intercostal muscles and the integuments, it may be easily wounded. The calibre of this artery being sufficiently great to produce mortal hemorrhage if wounded, it is of consequence to know how to stop this fatal bleeding by placing a ligature on the artery. The following is the operation recommended:

1*st*, Cut the integuments down to the external intercostal muscles, to the extent of two inches in lean, and two and a-half in fat, subjects, beginning at the external border of the sternum, encroaching a little on its external surface, and stretching to the middle of the corresponding intercostal space, following a line parallel to the axis of the ribs.

2*d*, Tie carefully the small arterial branches, which might embarrass the operator by the blood which they furnish.

3*d*, Cut, by means of a director and straight-bladed bistoury, layer by layer, the external and internal intercostal muscles, taking care, in cutting the latter, to place the director in a sufficiently oblique direction, to avoid wounding the pleura. That being done, the internal mammary artery will be distinctly observed placed between the nerve, which is situated externally, and the vein, which is placed internally, and above the pleura, to which it nowhere adheres. Nothing is then easier than to place, by means of a crooked needle, or a director a little bent, a ligature on the artery. The wounding of the pleura may be avoided by taking the precaution mentioned above.

As the inferior portion may furnish blood from its anastomosing with the epigastric artery, it may be tied by the same operation in the intercostal space below.

Observations and Medico-Legal Researches, in relation to a case of Poisoning by Corrosive Sublimate. By D. Ollivier, of Angers, and Barruel, Chief of Chemical Processes to the Faculty of Medicine, Paris. (*Archives Generales, II series, Tome vi. October* 1834.)—Three children of a woman named Nelissen, who were several days convalescent from measles, were ordered by the attendant physician half a drachm, (*demigros,*) or 29½ grains of calomel, divided in doses of 6 grains, to be administered in the following manner: The eldest, aged 7½, to take 18 grains in three doses; the younger, aged 3½, to take 12 grains in two doses; and the youngest, about 2 years, to take about 6 grains, in one dose.

On the 20th of August the mother administered to each the prescribed doses, diluting with a little water in a tin spoon the medicine, mingled with a little sugar in powder. The eldest, a girl, after taking only half the dose, complained immediately of the very disagreeable taste of the medicine, and vomited several times; but her mother, viewing this feeling as the result of the natural repugnance at this age to medicine, gave her the rest. The vomitings augmented quickly, accompanied with convulsions and alvine discharges. The matters vomited were mixed with blood. As the symptoms were aggravated, they applied immediately to the druggist, who gave the child milk and whites of eggs beat with water. This was two hours after the administration of the medicine, when these fluids were taken in small quantity only. The cries and vomiting were less frequent. General feebleness, interrupted from time to time by a few convulsive contractions, came on, and the girl expired three hours after the powder was taken.

Her younger brothers had taken, at the same time as she, the prescribed doses. The eldest brother was immediately attacked with repeated and abundant vomiting of blood-coloured fluids, followed by purging, then a tendency to sinking, interrupted at intervals by colicky pains and evacuations. The youngest, who had taken a dose of only six grains, had also vomiting of blood-coloured fluids, and some purging, and he soon fell into a state of insensibility, which ended in death at the end of eleven hours.

The mother, witnessing these mournful accidents, and observing that the tea-spoon employed to exhibit the medicine had assumed a blackish-brown colour, immediately suspected that a fatal mistake had been committed by the apothecary, and that probably the children had been poisoned. Her apprehensions were realized. The pupil of the druggist, by inadvertence,—for the prescription was distinct and unequivocal,—had given corrosive sublimate instead of calomel. Two hours, also, had elapsed before the two elder children had began to take the milk and albuminous fluids. The youngest refused to the last every kind of liquid.

The second child, viz. the boy of 3½, who had taken twelve grains of the mineral, after vomiting at first abundantly, and having afterwards purging, continued to feel squeamishness during the rest of the day, but without vomiting. When seen by M. Ollivier next day, he was free from fever, could drink without vomiting, and the stools were few. During several days, the parents entertained hopes of this child. But the alvine discharges became gradually frequent, with tenderness of the belly and meteorismus, dry tongue, quick pulse, and other symptoms of *gastro-enteritis*, which progressively became more intense; and the child died on the 12th September,—*twenty-three* days after the sublimate was given. In spite of all applications, M. Ollivier did not succeed in obtaining permission at this time to inspect the body, as the public investigation of the matter was then closed.

On the 21st of August, the day after the accident, M. Ollivier was appointed by the public prosecutor, conjointly with M. Barruel, to inspect the bodies of the two children first cut off, which was accordingly done about twenty-five hours after the death of the girl, and eighteen hours after that of the boy. The appearances recognized were the following.

There was no cadaveric rigidity; the members were flaccid, and the belly was enormously swelled and tympanitic. Slight livid discoloration was observed on the posterior surface of the trunk. The mucous membrane of the mouth was not discoloured, but a greyish white, of an aspect quite similar to that produced in membranes of this kind when long in contact with the solution of corrosive sublimate, yet without induration of its tissue. The tongue presented in patches the same aspect. The mucous membrane of the œsophagus was easily detached in curling shreds; an arrangement less marked in the body of the boy.

In the girl, the mucous membrane of the stomach was of a rose colour, without distinct capilliform injection in two-thirds of its extent, and offered no perceptible alteration in its natural consistence.. But in the inferior third of the stomach, from the *pylorus* to the upper half of the great chamber, this membrane had a deep bistre colour, which was not uniformly diffused over all points, but coloured in longitudinal bands and patches of a rounded shape. The mucous membrane, when affected with this coloration, was very friable, and came away in brittle peelings when scraped with the nail. It was not, properly speaking, softened.

The stomach of the boy presented the same peculiarities, but the alteration of the mucous membrane was less extensive. The mucous membrane of the intestine was uniformly rose-coloured, with arborescent injection well-marked in the upper third of the small intestine in the body of the girl. The mucous membrane of the intestine of the brother was scarcely coloured, was covered with masses of mucus, and of its natural consistence.

The stomach of the girl contained a pulpy fluid of a rose colour, and the *jejunum* contained a certain quantity of whitish gruelly matter. The fluid contained in the stomach of the boy was less brown, and in smaller quantity than that of the stomach of his sister. His intestines contained nothing but mucus.

The internal surface of the left ventricle of the heart of the girl presented two ecchymosed patches beneath its inner membrane, which was pale and whitish. The largest of these was situate at the base of a *columna cornea*, and upon dividing cautiously the inner membrane of the heart, it was ascertained that a little blood was extravasated beneath it, and not in the substance of the fleshy fibres.

Two very small and less distinct ecchymotic patches were found under the inner membrane of the left ventricle of the heart of the boy, which was equally whitish throughout.

The presence of ecchymotic patches, of the description specified, was observed by Orfila in several of the experiments made with corrosive sublimate upon living animals.—(Toxicologie Generale, Tom. i. p. 26.)

The other organs of the two bodies presented nothing particularly worthy of observation in reference to poisoning.

The stomach and intestines of both bodies, previously tied at both ends, were removed; and, being deposited in suitable vessels subsequently sealed, the contents were submitted to chemical analysis.

The cavity of the stomach of the girl contained a pulpy fluid of a brown rose colour, and of a smell like churned milk. The small intestines contained a considerable quantity of curdled matter, of a dead white, having the appearance of white cheese or indurated white of egg; but upon touching it this matter presented the characters of coagulated cheesy matter.

The stomach of the boy contained a small quantity of pulpy fluid, less brown, but more rose-coloured, than that of the girl, and without the odour of churned milk. The *parietes* of the intestines were covered with abundant quantities of mucus, but their cavity did not contain white curdled matter.

The fluid obtained from the first stomach after being filtered was limpid, and of a yellow colour. A portion of it treated by a concentrated solution of hydro-sulphuric acid underwent no change of colour, and formed no pricipitate. This result showed, that, if death had been caused by a poisonous metallic salt, it was not dissolved in the liquid; and that, if not rejected by vomiting, it ought to be found in the solid and mucous matters left in the filter.

In order to ascertain the point beyond doubt, MM. Ollivier and Barruel subjected to elaborate chemical analysis the bluish-brown matter with which the tea-spoon was encrusted, and the solid and mucous matters found in the stomach.

Our limits do not permit us to detail all the steps of the process employed for these purposes. It is sufficient to say, that the bluish-brown incrustation, which adhered but loosely to the spoon, by immersing the latter in distilled water, was readily detached in the form of a grayish-coloured powder, which fell to the bottom of the vessel, while the supernatant fluid, after being decanted, though limpid, had a distinct metallic taste; and, upon the addition of hydro-sulphuric acid, furnished a dirty-yellow precipitate, insoluble in ammonia.

This experiment, combined with the colour of the spoon before immersion in distilled water, and the insolubility of the incrustation, showed that the matter given in the spoon had been decomposed by the metal of the spoon, which had usurped its place, while, at the same time, the basis of the medicine had been detached, and formed the precipitate.

The dirty-yellow precipitate was then treated by excess of nitric acid, and filtered; and the clear fluid, upon the addition of nitrate of silver, furnished a white curdy precipitate, completely insoluble in water, insoluble in water and excess of nitric acid, and but little soluble in ammonia. This showed that the medicine must have been a metallic chloride.

The insoluble precipitate first detached from the spoon after being dried, was then examined by the magnifying-glass, when its surface presented numerous minute points of a silvery lustre, which, when triturated and compressed, proved to be white brilliant globules, having the appearance of mercury.

When the powdery matter with the metallic globules was gradually heated in a glass tube, the former gradually disappeared, and in the cold part of the tube were condensed numerous white brilliant fluid globules, which were easily recognized to be mercury.

The residual powdery matter not sublimed was proved to be lead, which had united with the chloric acid of the sublimate.

Though these experiments rendered the point very probable, they were not conclusive as to the matter mixed in the spoon having been corrosive sublimate; and in order to decide this, comparative experiments were made with the tea-spoon when cleaned, first with calomel, and then with corrosive sublimate. The first produced no change on the spoon. The moment a few grains of the second were applied with a little distilled water, the spoon was blackened, and presented the same appearance as that used to administer the powder to the children.

The detection of the poison in the curdy and mucous matters contained in the stomach and intestines was attended with great difficulty. It is well known that Orfila proved experimentally, (Toxicologie Generale, Vol. i. p. 310), that milk and albuminous substances act by decomposing corrosive sublimate, or bichloride of mercury, and converting it into calomel, or protochloride of mercury.

The accuracy of this statement, they thought it proper to verify. They *first* sought to discover whether the caseous matter actually contained calomel; and with this view the matters were triturated with *aqua potassæ*, which would not only dissolve the caseous matter, but decompose the calomel, by precipitating from it the black protoxide of mercury. This, however, was not the result. Instead of a black precipitate,—the black wash of the druggist,—yellow *flocculi* were thrown down, *i. e.* the yellow wash, indicating the existence, in all probability, of corrosive sublimate still undecomposed.

On the idea, therefore, that these yellow *flocculi* were occasioned by the decomposition of a persalt of mercury, it was requisite to determine whether they consisted of the peroxide of that mineral.

They were therefore subjected to the action of chlorine gas, transmitted through water; after which into the liquor was immersed a plate of gold, surrounded by a spiral plate of tin, when, with effervescence, the plate of gold very soon assumed a white colour. The spiral tin plate was whitened at all the intervals which separated each turn of the tin plate, and it had become brittle.

The whitening of the gold plate proved amalgamation, and consequently that, 1*st*, the flocculi obtained in the solution by potass were peroxide of mercury; and, 2*d*, that, though in many circumstances milk or albumen decomposes corrosive sublimate, and converts it into calomel, this decomposition is not always complete, and that these matters may be combined with it without decomposing it. Milk and albumen must still, however, be allowed to be very efficacious against poisoning by corrosive sublimate, since they so involve that salt, that water removes from it nothing soluble.

The plates of gold and tin were afterwards found, upon the application of heat, to furnish globules of mercury. The existence of a mercurial salt was likewise proved in the pulpy and solid matters contained in the stomach of the girl and boy, and even in the mucus, and various patches of the mucous membrane of the stomach of both.

From all these facts, the authors of the report infer, that the death of these children was caused by poisoning; and that the poisoning was produced by the bichloride of mercury or corrosive sublimate.

M. Ollivier very properly takes occasion here to point out the urgent necessity, in the prescription of medicines, which in doses of a few grains are violent poisons, of physicians adopting the names of the ancient nomenclature. These denominations, he observes, having no mutual analogy, can occasion no confusion, unless by the most culpable inattention. There are certainly no substances to which this observation is so applicable as calomel and corrosive sublimate; for while in one nomenclature the former is called submuriate, and the latter muriate of mercury, and in another the former is named protochloride, and the latter bichloride of mercury, the affinity of name and sound is so close, that it is a very easy matter for an ignorant druggist's boy, especially if he is too proud to acknowledge his ignorance, to give five or six grains of the latter instead of the former. If druggists and physicians, on the contrary, would adhere to such plain and easily distinguished names as *Calomel* and *Corrosive Sublimate*, errors of this kind must be almost incapable of occurring.

Mere chemical denominations are, indeed, in every respect, improper in the practice of medicine and preparations of pharmacy. They necessarily are liable to change with every new fact in chemical experiment, and every new view in chemical doctrine; and the denomination that may be admitted to be justly applicable and philosophical one year, may be proved to be most erroneous and unscientific in the course of a few years or even months. There is, further, no necessity for the name being expressive of the composition and proportions of ingredients in the substance; and if it were necessary, it would be impracticable; for, as we have seen, with regard to calomel and corrosive sublimate, unless we could suppose chemistry to be a science not only fixed, but in all respects perfect, it is impossible to apply to these substances any short and distinctive name, which could express, without the chance of error, the true composition and proportions of ingredients in each. The name of any medicine, whether chemical or Galenical, need perhaps have little or no reference to its constitution.

With regard to the curious fact of discovering in the solid and mucous contents of the stomach and *duodenum* undecomposed corrosive sublimate sufficient to form the yellow wash or peroxide, and the supposed contradiction to the alleged utility of albuminous substances as decomponent agents and antidotes, M. Ollivier justly remarks, that the mercurial poison was so involved in the caseous matter, that it was prevented from being further decomposed, and from acting upon the organs containing it. After the portions first presented to the albuminous fluid had been decomposed, quantities were still contained in the interstices of the curd, which could not be decomposed for want of fresh albuminous fluid. It is also to be borne in mind, that two hours elapsed before albuminous remedies were administered, and during this time, in all probability, the poison had inflicted on the stomach irreparable injury, or, at least, had caused so much irritation, as to induce speedy and certain death.

These cases are instructive in showing the comparative effects of large and moderate doses of such irritant poisons as the metallic salts. In the first case, in which death took place in *three* hours after swallowing eighteen grains of corrosive sublimate, the poison appears to have operated chiefly by the direct effect on the stomach and nervous system, as there was no attempt at reaction. In the case of the youngest, also, in whom death took place *eleven* hours after swallowing six grains of corrosive sublimate, the poison appears to have taken effect much in the same manner, though the smaller quantity made a difference in the degree of the energy with which it acted on the stomach and nervous system. The tender age of the sufferer, and his refusal to take the antidotes, appear in this instance to have rendered the frame less liable to resist so active a substance, and to have contributed to the fatal event.

In the case of the elder boy, on the contrary, who had taken twelve grains of sublimate, and in whom the smaller quantity appears to have been more completely decomposed, we observe not only the primary, but the secondary effects of the poison. The primary effects, though very violent, were nevertheless inadequate to produce death by the direct effect upon the stomach and nervous system. Very soon, however, the secondary effects, or the symptoms of reaction, in consequence of the injury done the gastric and intestinal tissues, were established; inflammation of these tissues followed, and proceeded steadily and uniformly to the fatal termination.

We have been since informed, that, after a judicial investigation, the druggist has been fined 600 francs, with costs; the druggist's apprentice has been sentenced to be imprisoned for one month; and both parties are to make up between them the sum of 2000 francs, as damages to the father of the children.

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PART I.

ORIGINAL COMMUNICATIONS.

Art. I.—*Select Cases and Communications, forming part of the* Transactions of the Medico-Chirurgical Society of Edinburgh. Communicated by the Council.

Section Third.

Cases illustrative of various diseases of the organs of respiration and circulation.

1. *Cases of Anomalous Affections of the Respiratory Organs.* By John Gairdner, M. D., Fellow of the Royal College of Surgeons of Edinburgh. (Read in January 1834.)

A peculiar affection of the Organs of Respiration.—The subject of the following case is a gentleman about 35 years of age, of active and temperate habits, and of a healthy constitution. His family were seized with *pertussis* in September last. He began to cough violently towards the end of that month. The cough occurred in fits; and although he is reported to have had hooping-cough very unequivocally characterized when he was a child, yet I have little doubt, from the spasmodic character of the present attack, that it must be regarded as a second visit of that disease. An emetic was prescribed, and some other remedies, and the disease continued with little apparent change till the early part of October, when a new symptom came on. He was seized with difficulty of breathing so suddenly, that he had no time for the application of remedies; and so violently, that he rose from the bed and danced about the room in a state of terror and distraction. The impulse of his sensations was so strong, that he could not resist the disposition to roar in a frantic manner, which alarmed both his family and his neighbours. He is by no means a person of an irritable or mobile temperament, or likely to give way to his feelings needlessly; but he described the impulse of his sensations at the time as quite incapable of being controlled. He felt a sense of constriction at the upper part of the *trachea*, and thought himself on the point of dying from suffocation. After the fit of breathlessness had ceased, there still remained a distressing sensation at the chest. Since this first fit, he has had many such attacks, and they have been pretty uniform in character. They have generally lasted a quarter of an hour. They have twice occurred in the day, but on all other occasions in the night. They appear to be more frequent in a humid state of the atmosphere, which excites sensations in the throat premonitory of their approach. These sensations are also produced by vocal exertion, and he often finds it difficult, especially after the fits, to keep up a continued conversation with a friend for any length of time without rousing them. They are also excited by the air of places which are confined and ill-ventilated, such as by that of a stage-coach on one occasion, and of crowded apartments on several others. When they are present, they seem to be aggravated by lying on either side, so that to avoid a fit, under such circumstances, he is forced to lie on his back, and this he now does habitually at all times.

Since the first occurrence of these fits, they have become less frequent in their return, having been originally once every two days, or even oftener, and being now sometimes a week or ten days absent. They have also, in some instances of late, been less sudden in their accession, and have thus afforded time to apply some remedy; but they are for the most part quite as violent as ever. They are followed by less of the distressing sensations at the chest; but there is now, and always has been after the attacks, a feeling of huskiness and thickness about the windpipe, perceptible by himself, but not influencing the sound of his voice, or at least not in such a degree as to make it evident to others.

It is difficult to say to what extent the circumstances of improvement in the general character of the case are fairly attributable to the remedies employed; but an enumeration of these remedies, and of their more obvious effects, may perhaps add in some degree to the interest of this narrative.

Two free bleedings were employed at the beginning, and he was twice blistered a little later, once on the chest, and once on the sides of the *trachea;* but he did not appear to be at all benefited by any of these measures. Ether draughts were of no avail; but the inhalation of the vapour of ether,—a remedy which I frequently employ, appeared to the patient to have averted the approaching attack on some occasions. Opium also appeared to ward off the coming fit, and to banish its premonitory symptoms. It was taken sometimes in the form of the muriate of morphia, and sometimes in that of the camphorated tincture. Of one or other of these he generally took a dose at bed-time, when he felt any apprehensions of an attack. Its good effects were greatly counterbalanced by the visions, watchfulness, and constipation, which invariably followed it. It was not always successful in keeping off an attack, but it appeared to me and to the patient himself to be decidedly beneficial on the whole. It rendered the frequent use of purgatives indispensable. *Stramonium* was unequivocally injurious. The only time he smoked it, he had an immediate and violent paroxysm of his disease. *Conium* was used for some time, to the extent of three grains of the extract three times a day at first; the dose being subsequently increased to five grains. He was ten days without a fit after he first began this remedy, but the fits came on afterwards as formerly, and this while he was regularly taking the *conium.* Exercise has been unequivocally useful, especially in clear weather; but even in an unfavourable state of the atmosphere he appears to derive benefit from a moderate walk in the open air. When forced to continue in a state of inaction, he is apt to be seized with coldness of the extremities, and with certain undefinable sensations, which past experience has taught him to regard as premonitory of his fits of breathlessness.

I had written thus far prior to the 22d of December, on which day he had an attack of his complaint. From that time, till the night between the 3d and 4th January, he was without a fit,—a length of interval which excited my hopes that the disease had departed from him. His general health had improved remarkably, and the uneasy feelings in the *trachea* had abated. About the 30th December, some of these feelings returned, and were imputed by him to the unfavourable state of the weather. On the 3d January he was much engaged in business, and while arranging papers complained of tension and distress about his head. Very imprudently disregarding this warning, he supped out, and remained late; and soon after he came home, on the morning of the 4th January, he had a smart fit like those already described, but of short duration. Slighter fits followed the two following nights, but he has been much better since Monday (6th.)

I have only to add, that I cannot discover, either by percussion or by auscultation, or by any other species of indication, any evidence of organic disease of the thoracic viscera.

February 1835. The patient soon after got well, and continues well at present.

A peculiar Convulsive Affection of the Respiratory Muscles.—In December 1825, I was first asked to see a young lady, then about 17 years of age, who laboured under a very unusual affection, one or two attacks of which she had previously experienced when in England. It may be described as a sudden spasmodic action of the respiratory muscles, producing a sound somewhat resembling a cough, but much louder and shriller, and differing from it in its general nature and character quite as much as in its intensity. Its sound might be said to be something between that of a cough and that of a howl. It was repeated every five or six seconds during the whole of her waking hours, subsided altogether at night when she fell asleep, and again commenced as soon as she awoke in the morning. Its first commencements in the morning were feebler and less audible than through the day, but it soon became louder and at the same time shriller, and in the space of an hour or less was quite clearly audible all over the house, and even in the street. The tone of her voice in speaking remained unaltered, and though the perpetual recurrence of this unusual action considerably impeded conversation, yet she possessed a power of suspending it for a very short space of time, which enabled her sometimes to finish a sentence before its repetition. For a longer space of time she could not by any effort suspend it. From the time of life at which it commenced, it is probable that it might be connected with the functional changes which are incidental to that period. The *catamenia* were at first, if I recollect rightly, rather scanty, though regular; but the disease continued to visit her occasionally long after their natural flow had been completely established.

I saw her under this affection occasionally for about two years and a-half, during which she had many attacks at various and uncertain intervals. The duration of the attacks was at first nearly a fortnight. Afterwards they became less and less protracted, and I remember some attacks which lasted only two or three days. After employing a considerable variety of treatment, including a number of antispasmodics, tonics, and purgatives, and the local application of rubefacient, or as they are usually termed *calefacient* plasters, I became satisfied that the steady use of purgatives was of more benefit than any thing else, more especially when these were given in moderate and repeated doses, so as to keep up a continued action on the intestinal canal. The first remedy of this sort, the effect of which struck me, was one which I believe is not now much employed, the tincture of black hellebore, or *Tinctura Melampodii* of the older medical writers. During the use of this, which acted pretty powerfully on the bowels, an attack of the disease appeared, when compared with previous ones, to be greatly shortened. She afterwards took it under a succession of attacks, with great apparent advantage. There was always a very great discharge of solid feces from the intestines, and the complaint ceased soon after. Sometimes a slight change of its character preceded the cessation, and the next morning she awaked without it. I afterwards changed the medicine for the Barbadoes aloes in small and repeated doses, with effects precisely similar to what I have already described. I also combined this treatment for the sake of the general health, with the use of steel, sulphate of quina, and other tonics; and this appeared to me to be attended with much advantage.

The case has since been under the professional charge of my friend, Mr George H. Bell, who, after perusing my notes, has done me the favour to transmit to me the following letter to complete the narrative.

" My Dear Sir,—I have little to add to this your account of our patient's case. Since I have become acquainted with it, now six years back, she has had few of her attacks, and they have seldom lasted above forty-eight hours. This, however, is not from any improved mode of treatment, or from any new view of the case, but entirely, apparently, from a modified state of the affection. I have not been able to discover that the attacks are modified by any particular condition of the system, and to all appearance, the peculiar spasmodic affection of the *glottis*, to which the young lady is liable, is the character which a common cold takes with her. I may observe, however, that when an attack of catarrh with the *bark* is attended also with cough, the *bark* and cough are as formerly quite distinct.

" As to treatment, I attempt nothing;—attention to the bowels and confinement to bed being all that is necessary. Believe me, very sincerely yours, George Hamilton Bell.

" 13, *Castle Street*, 31*st Dec.* 1833."

Every practitioner who has had much experience in the treatment of diseases must have occasionally met with cases of incessant and distressing hiccup, suspended, like the affection just described, during sleep, and, like it too, returning when the individual awakes. The same analogical fact is true also of another and very rare morbid affection, which occurred to my friend, Dr Beilby,—I mean incessant sneezing. Dr Beilby has kindly complied with my request, by presenting to the Society his interesting notes of the only case of the kind I have ever heard of; a case which appears to me to be important in itself, and which will give additional value to the one just related, from its obvious bearing upon the subject of it.

" *A Remarkable Case of Sneezing.*—A young gentleman, 13 years of age, had been affected, when I first saw him, on the 29th of January 1823, with constant sneezing for three weeks, at first in rather violent paroxysms, with intervals of many minutes; but at my visit, occurring from three to six times every minute, each sternutation occasioning now a comparatively slight degree of bodily agitation, and accompanied with a forcible expulsion of air between the nearly closed teeth, producing the sound '*tche.*' No moisture was projected from either the nose or mouth, nor did the eyes water. The state of the nostrils I could not at first examine, but I afterwards found them dry and red; the tongue was pretty clean and rather red; his pulse 70, but not strong; he had very little appetite, but some thirst; he had been long in delicate health, was said to be '*very bilious,*' and had been taking considerable quantities of magnesia, on account of almost constant acidity of stomach. Some months before, he had endured severe headach and vertigo to such degree, that he several times fell down, often lost his sight for many seconds, and was frequently quite unable to read for a considerable time together. He experienced benefit at that time from the application of leeches to the head. Cephalic snuff, and two or three other nostrums were the only treatment recently employed.

" Blisters behind the ears, pretty free purging, and the injection of olive oil into the nostrils, were the only treatment I adopted at first; and when after a week the sneezing was become much less frequent, perhaps about every two or three minutes, I recommended the use of carbonate of iron, and the cautious and gradual exposure to cold air. In the middle of February, the sneezing still continued, but at intervals of five or six minutes, or even longer when his attention was steadily engaged. In the beginning of March, he had no returns of the sneezing, except when he was fatigued.

" I should have mentioned that the sneezing was always suspended during sleep, but recommenced immediately on awaking, and he sometimes seemed to awake sneezing.

" *January* 1, 1834. W. BEILBY."

2. *Case of Sudden Death from Perforation of the Pleura Pulmonalis, consequent on Disease of the Pulmonary Substance.* By Robert Graham, M. D., Fellow of the Royal College of Physicians, and Professor of Botany in the University of Edinburgh.

John Meek, aged 57, a labourer, was admitted into the Clinical Wards of the Infirmary, on the 20th November last. His symptoms were those of dyspepsia, and not particularly urgent. They consisted of weight and oppression at *epigastrium* after meals, continuing till the contents of the stomach were vomited, often without, sometimes with, acidity; of *pyrosis*, and of frequent flatulent eructations. The bowels were rather costive; there was little thirst; the tongue was furred; there was emaciation, and the legs were slightly œdematous. The pulse was quite natural; the *abdomen* was free from distension; the patient was without headach, *gastrodynia*, *cardialgia*, or other dyspeptic symptom, excepting those above stated. There was no tumour felt in the *epigastrium*, nor pain on pressure. His complaints were only of six weeks standing, previous to which he asserted that his health had been good. His occupation had exposed him a good deal to cold, but not to hard labour, and his diet had been sufficiently nutrient. The treatment consisted at intervals in antacids, laxatives, opiates, bitters, blisters, and his diet was regulated, some steak being given to him daily, and the only vegetable matter allowed was bread. On the 4th of December he complained much of hiccough, with flatulent distension, and on the 8th, of pain under the right *mamma*, the pulse being 68 and natural. On account of this last symptom, a draught with nitrous ether and laudanum was given, and the pain immediately ceased. During his residence in the Hospital, the symptoms considerably abated. Before his admission the vomiting generally occurred twice daily,—never after admission more than once, excepting when immediately excited by swallowing his medicines, and then very rarely, and for many days before his death he scarcely vomited at all; his spirits and appetite improved, and he thought himself recovering. He was mistaken, and I disappointed. After a good night he suddenly complained of great debility on the morning of the 15th, asked a cup of tea from the patient in the next bed, but before it reached his lips he died.

Sudden death very often occurs after long-continued organic disease of the stomach, from rupture and escape of the contents, but not with symptoms such as we had here, and I looked with great interest to the dissection. The body was opened on the 16th December, twenty-nine hours after death. The following were the appearances observed.

ABDOMEN.—*Omentum* retracted, much thickened and lodged in the left lumbar region. *Diaphragm* pushed high into the left side of the chest; a considerable portion of the right side near the ensiform cartilage convex towards the *abdomen*. The *Stomach*, lodged entirely in the left *hypochondrium*, contained a small quantity of coffee-coloured turbid fluid. The peritoneal coat free from disease; great thickening towards the pyloric extremity; the diseased part was of several inches diameter, having the *pylorus* towards one side, was elevated above the level of the mucous coat, its internal surface white, reticulated, over the greater part continuous, but supporting several rounded protuberances; its texture like soft and friable cartilage, its outline defined and circular. *Liver*.—Right lobe adhered by a long narrow band to the diaphragm, its internal structure healthy.

THORAX remarkably resonant on the right side, and there the intercostal spaces were raised to a level with the ribs, though the subject was much emaciated, and the spaces therefore much depressed on the left side. The *left lung* was small, with numerous tubercles, particularly in the centre; the structure in a comparatively small portion towards the edges seemed tolerably healthy; and there was slight adhesion of the lower lobe to the *pleura costalis*.

The *right lung* was completely collapsed, pressed downwards and towards its root; the posterior part of middle lobe contained some tubercles; the lower lobe adhered to the diaphragm by a copious deposit of firm lymph. Within this part existed a dark-coloured cavity about the size of an egg, having pulpy walls, opening into the cavity of the *pleura*, and communicating distinctly with the *bronchia*. A small quantity of blood had lately been effused, and formed a thin clot, spread over and adhering to the *pleura pulmonalis* in the neighbourhood.

This case proves to us, what indeed required no proof,—innumerable cases having long ago established the fact, that very extensive organic disease may exist in organs of the utmost importance to life, without the patient being aware that any thing is wrong. This man never complained of a single thoracic symptom except the pain mentioned under the right *mamma*, eight days before his death. This was unaccompanied with the smallest fever, and immediately removed by an antispasmodic draught. Yet after death the appearances proved that the left lung had been long nearly destroyed, and the right considerably injured by chronic disease; and it is difficult to believe that the disease of the stomach could have been of such recent date as the patient had reported.

The chief interest in the case arises from the cause of death. It appeared that the patient had long breathed by the right lung alone, or nearly so. Subsequently this lung had become the seat of acute inflammation. The nature of the disorganization, I think, warrants me in believing that gangrene had occurred, though I could perceive no fetor;—but whatever had been the immediate cause, the *pleura pulmonalis* had been ruptured, air had escaped into the right cavity of the chest, the lung, the only serviceable one, had been immediately compressed, and the patient suffocated.

8th June 1831.

3.—*Case of Phthisis Pulmonalis, with uncommon symptoms, occurring during convalescence from Fever.* By the late JAMES C. GREGORY, Fellow of the Royal College of Physicians, and Physician to the Royal Infirmary of Edinburgh.

JAMES FERGUSON, aged 19, was admitted into the Royal Infirmary under my care, on the 22d of January 1831, labouring under a well-marked, but not severe attack of common continued fever. It had been ushered in three weeks previously, after exposure to cold and wet, by rigors, followed by headach, vertigo, general pains, languor and debility. His tongue was white, his skin warm but moist, his pulse about 90. He had slight cough, but without expectoration, and without pain even on full inspiration. The only signs of an affection of the lungs which could be discovered by auscultation were the slight catarrhal râles which usually accompany the common fever of this country. No signs of tubercular disorganization could be detected at this time in any part of the lungs. Under the usual treatment the febrile symptoms speedily abated. On the 26th of January, his pulse had become natural, and his tongue clean. But he had still a little cough without expectoration, and his bowels were slow. On the 30th, or in eight days, he was reported as free from complaint, his pulse was natural, and his appetite had returned; his cough had disappeared, and he had been put first on common diet, and afterwards on full diet at his own request. From this time till the middle of February, he continued free from complaint, requiring only the occasional use of purgatives. He felt himself so well, indeed, as more than once to express a wish to be dismissed and to return to his occupation as a gamekeeper. But his sallow complexion, and somewhat unhealthy appearance, induced me to persuade him to remain a little longer in the Hospital.

On the 23d of February, I found him complaining of pain beneath the *sternum*, increased on full inspiration. His pulse was 112 and rather sharp; his breathing rather frequent, but when particularly questioned on the subject, he stated distinctly that he had no cough or expectoration. A pretty loud mucous râle was now heard under both clavicles, and in the upper portions of both lungs, but most marked on the left side, where it almost amounted to the cavernous râle. The respiratory murmur was faint and bronchial under both clavicles and in the *axillæ*; and in these places there was also a degree of that loud resonance of the voice, which has been called bronchophony; but there was no distinct pectoriloquism. From this examination, although it furnished no unequivocal signs of the existence of cavities in the lungs, I had no hesitation in announcing, that there already existed extensive tubercular deposition in the upper parts of both lungs. The absence of cough and expectoration, I could only ascribe to the tubercular disorganization being as yet confined to the *parenchyma* of the lungs; or at least not being accompanied with the usual increased and morbid secretion from the mucous membrane of the *bronchia*. The pain was removed by a small blood-letting, and the application of a blister; but the pulse still continued frequent, and he became emaciated.

On the 15th of March he had another attack of pain of chest, with very rapid breathing, but still without cough, which was removed by another blister. At this time the mucous râle had become distinctly cavernous over the upper part of the left lung, but the bronchophony did not yet amount to distinct pectoriloquism. His pulse was now about 130, and he had slight diarrhœa, which, however, was easily checked. Upon being closely questioned, he also allowed that he had now a slight cough, but only at night, and the expectoration was so scanty as not to cover the bottom of a spitting-box. His breathing, however, continued frequent. He had hectic flushings, but without sweating, and the emaciation advanced rapidly. On the morning of the 21st of March, his breathing became more difficult than it had previously been, and he expired rather suddenly, after expectorating a considerable quantity of thick puriform matter.

On examination, the *pleuræ* on both sides were found to adhere so strongly as to render necessary the removal of the *pleuræ costalis* along with the lungs. There was a cavity at the apex of the left lung, capable of containing a hen's egg, and communicating with several smaller ones. The whole substance of the lung was found studded with small cavities, varying from the size of almonds to that of peas; interspersed with portions of pulmonary substance condensed and indurated by tubercular infiltration. All these small cavities were filled with puriform matter; but the large one at the apex contained little or no fluid, and apparently had been the source of the puriform matter expectorated immediately before death. The right lung exhibited a similar appearance, with the exception of there being no cavity so large as that in the apex of the other lung.

The heart, liver, spleen and kidneys appeared healthy. There were several small ulcers in the lower part of the *ileum*, the *cœcum*, and the ascending colon; and there was some limpid effusion into the cavity of the *abdomen*.

It is very difficult to conceive that such extensive tubercular deposition and disorganization, as were found in the lungs of this young man, could all have taken place subsequently to his recovery from the fever, or in the short period of one month. It would certainly be much more consistent with daily observation were we to suppose that tubercles had been deposited in great numbers, and in their miliary form, over both lungs, previously to the attack of fever; and that the febrile action had merely accelerated the usual process of coalition and ulceration consequent upon their deposition. But even this more plausible hypothesis, it is not easy to reconcile with some of the facts of the case. 1. By his own account (and I frequently questioned him particularly on this point) he had been in perfect health previously to the attack of fever, and had never been subject to cough or shortness of breath; and some of his friends, to whom I afterwards applied, had never known him to be affected with any complaint of his chest. 2. During the course of the fever, there existed no symptoms of more serious disease of the lungs, than the slight catarrhal affection which usually accompanies our continued fevers;—and even that disappeared along with the other febrile symptoms. 3. At this time no signs of tubercular disorganization, or cavities, could be detected by auscultation over any part of the lungs. And lastly, from the end of January till the middle of February, he continued free from any symptoms of disease of the lungs, and his pulse remained natural.

Hence, if we are to adopt this view of the case, we must suppose, not only that tubercles had been deposited in great numbers, but that extensive disorganization of both lungs had existed for some time without giving rise to any symptoms of pulmonary disease,—a case which, judging from daily observation, it is perhaps equally difficult to conceive. Whichsoever of these views may be the most correct, this case must certainly be considered as a remarkable one, on account of the absence of several of the most usual and characteristic symptoms of the disease, and the uncommon rapidity of its progress,—twenty-eight days only having intervened between the accession of the first pulmonic symptoms and his death. In this respect, indeed, it is more remarkable than any authentically recorded case I have happened to meet with. A table has been given by Bayle, showing the duration of *phthisis* in 200 cases. Out of these only one proved fatal in twenty-five days, but in that case the symptoms were characteristic from the first, commencing with cough, puriform and bloody expectoration, *dyspnœa* and frequent pulse, followed by obstinate *diarrhœa*, night sweats and rapid emaciation. And in his section on *phthisis* arrived at its most advanced stages without being accompanied by the characteristic symptoms, the only cases given by him, in which any doubt of the nature of the disease could have been entertained, are those in which the pectoral symptoms had been masked by long continued diarrhœa. The most acute and rapid example of *phthisis* quoted by Andral in his chapter on the progress and duration of pulmonary tubercles, proved fatal in the fourth week after the appearance of the cough and the other characteristic symptoms.

The almost total absence of cough or expectoration, even after the other phthisical symptoms were unequivocally marked, is a point of some importance in the case, as it shows that the increased and altered secretion from the mucous membrane of the *bronchiæ*, which is the principal source of the expectoration in most cases of *phthisis*, is not a constant symptom, even where there is extensive disorganization; while it also affords a proof that cavities may be formed in the lungs without expectoration, and merely, as it would appear, by a process of ulcerative absorption taking place in the pulmonary tissue itself.

The only other point to which I wish to direct the attention of the Society is the value of the information furnished by auscultation in this case. When he first complained of pain of breast and his pulse rose, I immediately suspected him to be phthisical. But the fact of the absence of cough and expectoration, both then and previously to the attack of fever, would have tended very materially to remove that suspicion, had not an examination by the stethoscope immediately satisfied me that even at that time tubercular deposition existed to a great extent over the upper parts of both lungs, and soon afterwards (and still without the occurrence of cough or expectoration) that extensive disorganization with the formation of cavities had taken place:—thus affording early and very decisive evidence of the existence of organic disease in the lungs, in a case where the other symptoms, as I conceive, could only have justified a suspicion of the presence of such disease.

4. *Case of Tubercles in the Lungs in extreme old age.* By Robert Christison, M. D. Fellow of the Royal College of Physicians, and Professor of Materia Medica in the University of Edinburgh.

A man of the name of Watson, long known in Edinburgh as an almanack-seller, evidently in extreme old age, and represented to be in his 93d year, was admitted into the Infirmary with slight symptoms of general fever. These slowly increased, but never became violent; at length diarrhœa was induced, apparently by the too brisk action of a saline laxative, which was rendered necessary by a constipated state of the bowels of some days standing. The pulse then became very frequent, the tongue brown, and he rapidly sunk after being in the hospital seven or eight days. He had a trifling cough during this illness, but no difficulty or particular shortness of breathing, and no pain of the chest,—in short, no symptom which drew my attention particularly towards that quarter.

The body was examined chiefly with the intention of observing the natural appearances in so old a subject.

The lungs were found here and there united slightly by old adhesions to the *pleura costalis*. A great portion of the upper part of both lungs, but especially of the left, was condensed by gray hepatization, amidst which, as well as in the less condensed portion of the lower lobes, there was seen a great number of small defined tubercles, most of them not bigger than a large pin's head. Near the apex of the left lung there was a small, irregular cavity, without contents.—In the lower part of the *ileum* some ulcers were found, one of which was rather bigger than a shilling, and deep.

It is worthy of remark, that the appearance of some of the organs of the body, whose changes are usually believed to indicate with tolerable accuracy the progress of life, was that of middle age only. There was not any particular appearance in the brain or heart. But the whole sutures of the head were marked strongly on the outside, and even slightly within, by the usual serrated lines; nay, the upper half even of the frontal suture presented an obvious serrated mark externally. The whole cartilages of the ribs, with the exception of that of the first rib on each side, were free from ossification.

The subject of this case was an extremely active and entire old man; he had a considerable number of the front teeth of the lower jaw; during his illness he used, within two days of his death, to rise without help to stool; and a few days before admission was selling almanacks in the streets, and dancing vigorously, according to his daily custom. He was generally reputed weak in mind, and his dress was fantastic; but in all the professional intercourse I had with him his intellects appeared quite entire.

February 12, 1831.

5. *Case of Empyema and Pulmonary Tubercles, illustrative of the connexion between Tubercular Deposition and Chronic Inflammation.* By Robert Christison, M. D.

The subject of the following case was a girl not quite 6 years of age, who was attacked with obscure pulmonary complaints consequent upon scarlet fever; exhibited in the course of two months all the successive phenomena of chronic pleurisy and empyema; and died in the course of two months more, partly from the latter disorder, partly from chronic peripneumony and tubercular effusion, after having twice undergone the operation of puncture of the chest.

The attack of scarlet fever seems to have been mild, but accompanied from the first by a cough, so slight, however, as not to attract particular notice for some time. In the course of a fortnight an attack of shivering ensued, followed by pain towards the left side of the sternum, by difficult breathing, palpitation, increased cough, frequent sweating, and scantiness of urine. Venesection was had recourse to, as also frequent blistering of the chest, and always with marked, though temporary relief.

After being eight weeks ill subsequent to the attack of rigor, she came under the care of my colleague, Dr Alison; and was found to present characteristically the symptoms of pleuritic effusion in the right side. The right side measured nearly three quarters of an inch more than the left in circumference; the intercostal spaces were more distinct in the left than in the right side; the left moved more than the right side during inspiration; over the whole right side, but particularly in the lower region, there was great dulness on percussion; and the heart beat at the extreme lateral region of the left side.

The left side too of the chest presented some signs of disease. Posteriorly the sound on percussion was clear; but anteriorly it was dull, even a little below the clavicles; and the respiratory murmur was altogether masked by very loud bronchial and tracheal râles. In the right side, it is worthy of remark, the sound of respiration was nowhere absent. It was distinct, but bronchial and much fainter than in the opposite side; so that there is no doubt the sound proceeded, as was inferred at this particular time, from the bronchial respiration of the left side transmitted through the accumulated fluid.

The constitutional symptoms were urgent, hectic being completely formed, and the child much emaciated, and constantly harassed by cough, with scanty, clear expectoration, great difficulty of breathing, and want of sleep.

Little advantage having been obtained from the use of expectorants, diureties, and local applications, and the breathing becoming more and more difficult, it was thought advisable to try the chance afforded by puncture, although it was impossible to overlook the probability of the existence of some chronic disorder in the left lung, probably chronic peripneumony, with one or other of its sequelæ. Twenty ounces of pus were accordingly withdrawn by an aperture made in the lower part of the chest; and the aperture was closed by a compress and bandage. Considerable relief was presently obtained, the right side became of equal circumference with the left, and respiration could be heard in the upper fourth of the empyematic side. On the second day, the movements of that side during inspiration and expiration were decidedly improved, and the sound on percussion was pretty clear in the superior region. Matters, however, soon returned to their former state; the râles in the left side became louder and mingled with subcrepitating râle; the subcrepitating sound was also distinctly heard in the upper part of the right side; and the constitutional disturbance was manifestly much increased.

She came under my own care about the time when the symptoms were thus becoming aggravated. I determined to try again the effects of puncturing the chest; because, small as was my expectation of any permanent benefit, the girl evidently could not survive above a day without it. On the tenth day, then, after the first operation, it was repeated; and twenty ounces of a thinner pus were removed. After some temporary exhaustion she became for a day or two much easier, and could even assume the horizontal posture, which she had been unable to do for some time previous. But the fluid again manifestly increased in quantity, the breathing became very laborious, she complained at length of pain, tenderness, and tension of the belly, and four days after the operation she expired.

The body was examined in thirty-six hours. On raising the sternum a quantity of air rushed out of the right side of the chest. In the upper fourth of the anterior part of the chest, the lung adhered to the pleura of the ribs, and there it was pervious to the air and crepitant. Below, however, it was retracted to the posterior lateral parts of the chest, and to the diaphragm, and was firmly compressed, so that the greater part of it was not a fourth of an inch in thickness. The space left in consequence of its recession was partly filled with pus, together with about two ounces of coagulated blood, and partly with air. The entire *pleura* around the purulent cavity was thickly lined by old coagulable lymph in the form of a membrane, and the lung in consequence irrecoverably bound down. The pleural cavity of left side contained a pound of serous fluid with flakes of recent lymph, some of which adhered to the *pleura.* The *pericardium* presented a few spots of redness, and contained an ounce of slightly flocculent serum.

The left lung was universally and thickly studded with tubercles, many of them clear and miliary, many others opaque, few so large as a lentil. The upper part of the right lung, where not compressed, was in the same condition. Around these tubercular depositions there did not appear to be any trace of hepatization, or any of the other usual results of inflammatory action in the pulmonary tissue. None of the tubercular masses were softened. The condensed, flattened portion of the left lung was perfectly healthy, of a pale pink colour, of a spongy feel, though without any air, very dry, and wholly destitute of tubercular deposition. There were some small abscesses under the costal *pleura* of the right side. The bronchial tubes of the left lung presented much injection of their lining membrane, and an accumulation of viscous mucus in their interior.

There was no effusion in the cavity of the *abdomen*, and no redness or other disease of its serous membrane.

This case is of interest as illustrating two points. *In the first place*, it is a clear and unequivocal instance of tubercular deposition occurring in connection with chronic inflammatory action. The deposition must have taken place subsequently to the compression of the lower portion of the right lung, otherwise it is impossible to conceive how it should have most minutely pervaded the whole pulmonary texture with the exception of that part alone which was compressed. Such being the fact, it follows that this matter was deposited during the prevalence of chronic inflammatory action, resulting in the gradual progress of the *empyema* and pleuritic disorder. And it is not too great a stretch of inference to conclude, that the facts of the case supply some additional corroboration of the opinion now gaining ground among pathologists, that tubercular effusion sometimes originates in chronic inflammation,—being one of its terminations in persons of unsound constitution, in like manner as serous infiltration and hepatization are the usual terminations in constitutions of a different kind. *In the second place*, the appearances illustrate very well the effect of uniform pressure on an internal organ in preventing the progress of disease in its texture. It cannot but be supposed that every part of the lungs had the same tendency to tubercular deposition, and that the complete absence of this appearance in the compressed portion was owing to the compression; otherwise why should the diffusion of the tubercular matter have been exactly circumscribed by the line marking the boundary where the lung was pressed upon and retracted? Are not the phenomena here parallel to the well-known action of pressure in checking and circumscribing some forms of inflammation in continuous textures on the surface of the body, such as in the skin and subcutaneous cellular tissue?

6. *Two Cases of Tubercular Deposition of the Lungs, terminating fatally without proceeding to Softening.* By David Craigie, M. D., F. R. S. E., Fellow of the Royal College of Physicians, Physician to the Royal Infirmary, and Lecturer on Clinical Medicine and the Practice of Physic.

J. H. aged about 22, a young man of swarthy complexion, rather stoutly made, had enjoyed good health till about the twenty-first year of his age.

In the beginning of January 1827, he first began to complain of feebleness, occasional wandering pains in the sides, with tickling cough, and difficult and rapid breathing upon ascending stairs, or making any unusual muscular exertion. When he applied to his medical adviser, the pulse was found to be about 90, and to vary from this to 100; he had a sense of tightness upon taking a deep inspiration, and frequent hard cough. The expectoration consisted of mere mucus, not very opaque, and which did not sink in water.

These symptoms continued, and for several months became aggravated, notwithstanding the use of various remedial measures. The pulse, which was never below 90, continued to vary from 96 to 110; the cough and scanty mucous expectoration continued; the pains of the chest became more frequent in recurrence, and were felt often in the left side, and beneath the *sternum*; the feebleness and *dyspnœa* upon exertion rather increased; but the patient's most constant complaint was of a craving sense of a vacuity, referred to the region of the stomach; his nights were accompanied with heat, and towards morning the surface was covered with profuse sweating.

In this state, nevertheless, he was enabled to go about his usual pursuits till the second week of August, about six weeks previous to his death; and had even occasionally during the summer, in opposition to the opinion of his medical adviser, bathed in the sea.

About the middle of August increasing weakness, the almost constant sense of want in the region of the stomach, and above all, the labour and hurry of respiration, occasioned by moving about, or any exertion, obliged him to confine himself entirely to the house. The symptoms in the meantime continued much in the same state, with mere increase of the night heats and morning sweatings, and occasional diarrhœa, till the 27th of September, on which day he was not worse, or more uneasy in the respiration than he had been for weeks previously. On the 28th, the respiration became exceedingly oppressed, difficult, and laborious, with anxious, short, and rapid inspiration, rendering him quite unable to preserve the horizontal position, with anxious countenance, livescence of the face, a blue colour of the lips and nails, the pulse at 120, and intermitting. These symptoms continued with little change or alleviation for three days, when they terminated in death on the 1st of October.

The case was treated in the most prompt and judicious manner by Mr Caird, by general blood-letting at the commencement, local bleeding by means of leeches applied to the chest, occasional antimonials with opiates, blisters repeatedly applied to the *sternum*, sides, and every part of the chest, the occasional use of tartar-emetic ointment to induce pustulation, and the tincture of foxglove, with the view of diminishing the frequency of the pulse, and promoting the secretion of urine. In these respects, however, this drug had no effect whatever. The bowels were kept regular by occasional laxatives.

It may be proper to mention, that the cold bathing practised by the patient himself was invariably followed by an increase in the difficulty of breathing and oppression at the chest.

Through the whole course of the disease Mr Caird, who had repeatedly examined the matter expectorated in pure water, never found it to be opaque or puriform, or to sink in the water in which it was discharged.

The body was inspected on the 3d October 1827.

The muscles of the chest and *abdomen* were red and large, and the usual quantity of fat was found in the subcutaneous tissue, and was abundant beneath the *pectoralis major*, and, indeed, all over the chest.

The right lung, when the *sternum* was removed, did not collapse; but this was not owing to the adhesions, which were few, and chiefly at the convex and posterior region; but to the condensed and inelastic state of the lung.

The whole tissue of the right lung was occupied by minute indurated bodies, especially towards its superior portion, which was also condensed, inelastic, and uncrepitating. The substance of the lung was red, and rather firmer than natural, and when divided, emitted much reddish serum; while from the sections of the small bronchial tubes frothy mucus tinged with blood escaped. This was in general the state of the superior part of the right lung.

The inferior half, nearly bounded by an accurate and well-marked line, traversing the lung transversely, was perfectly firm and consolidated, like a portion of liver, of a deep-red brown colour, some portions being almost black, and discharging slowly a quantity of bloody serous fluid, intermixed with small quantities of frothy matter, issuing from the smaller bronchial tubes.

The three lobes of the lung adhered by means of false membrane uniting the interlobular *pleuræ*; and the *pleura* of this lower part of the right lung adhered extensively and firmly towards the posterior part, and over the diaphragm.

Upon examining the bronchial tubes, the middle divisions were found to be filled with mucus slightly tinged with blood, and of a faint reddish colour. This was most conspicuous in the hepatized portion of it.

The larger bronchial tubes presented mere mucus a little viscid and opaque, but not puriform.

The vesicular structure of the lower portion of the lung appeared to be obliterated; as the lung could not be inflated by any means, and sunk in water like a stone.

The tubercular bodies, which were most numerous in the upper part of the lung, were amorphous or irregular in shape, but were generally small, and in minute masses. None of them had gone on to softening, nor was a particle of puriform or purulent fluid recognized in any part of the lung.

The left lung was occupied with minute hard granular bodies, disseminated almost indiscriminately through its substance nearly in the same manner; and its substance was also inelastic, condensed, and uncrepitating, though in a less degree than that of the right lung. Parts of it were, indeed, firmer, and more fleshy, and of a deeper red than the others. But no part presented the extensive mass of firm fleshy consolidated substance which the inferior half of the right lung had assumed.

The bronchial tubes of the left lung contained some viscid mucus; and the bronchial membrane was redder than natural. A greater quantity of frothy serum escaped from this lung than the right. There was no appearance of *vomica*, and no trace of puriform or purulent matter.

The heart was of the usual size. The right auricle and ventricle were much distended, and contained fibrinous and bloody clots. The left chambers were rather small. The valves were natural.

The liver was not preternaturally large or hard, but was loaded with a considerable quantity of dark-coloured blood.

The spleen presented no unusual appearance, unless a considerable quantity of blood in its vessels and parenchymatous matter be regarded as such.

The stomach was a little shrunk, and exhibited some vascularity towards its cardiac portion, with *rugae* less distinct than in ordinary cases.

The *duodenum* was natural.

The *ileum* was vascular at its lower extremity, especially in the site of the aggregated follicles of Peyer, several of which were redder than natural, and a little more elevated, but without distinct ulceration.

The *omentum* and the mesentery presented a considerable quantity of fat; and the adipose cushion round the kidneys was as abundant as usual.

This case is remarkable in presenting no softening or tubercular excavation, and consequently no tubercular expectoration. The disease, indeed, under which this patient laboured from first to last, appears to have been rather of the nature of chronic peripneumony, and belongs to that class of cases to which M. Huzard, in the year 1799, directed some attention, as the occasional cause of phthisical symptoms.*

The progress is somewhat different from cases of ordinary tubercular consumption. Notwithstanding the gradual encroachment on the tissue of the lung by tubercles and hepatization, and its progressive incapacity for respiration, it seems to have produced less emaciation and less debility of the muscular system than in cases in which the tubercular deposition terminates in softening.

The connection of the tubercular deposit with the consolidation and other marks of inflammation of the lung, may be conceived to indicate that the former is the effect of the latter. I would merely on this point propose a question;—Whether there be not reason to believe that, in similar cases, the tubercular deposition pre-existed, and operated as a predisponent cause to the production and maintenance of the chronic peripneumonic disorder and its usual effects? This conclusion, I think, derives some confirmation from the following case.

Helen Crawford, aged 23, admitted into the Royal Infirmary on the 31st December 1834, had enjoyed good health, and was quite free from cough, until four months previously, when, from exposure to cold, a short cough commenced, unattended by expectoration.

Her symptoms continued of this character for three or four weeks, when she became affected with *dyspnœa* and the expectoration of a viscid white matter. About one month after she had *hæmoptysis*, which recurred twice, but at both times in small quantity.

At this time her symptoms became much aggravated, the cough and *dyspnœa* more urgent, and the expectoration more copious. For some time also she had been subject to frequent attacks of palpitation.

She is at present subject to frequent attacks of rigors, followed by heat and copious sweating, two of these fits generally recurring during the twenty-four hours; one about mid-day, and the other towards evening.

The respiration is difficult, 60 in the minute; the pulse 130, soft; the appetite bad; she has much thirst; the bowels reported to be habitually slow; tongue clean.

On the 1st of January the following report on the state of the respiration was given. The mucous and subcrepitous rattle were heard distinctly all over the left side, but especially in the posterior central subscapular region. Percussion elicits a good sound. The mucous rattle, with slight subcrepitous, less intense on the right side, where the resonance is clearer, and some bronchial respiration is heard near the vertebral region. Sonorous ronchus heard pretty generally over the right side of the chest near the vertebral region.

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* "Mémoire sur la Peripneumonie Chronique ou Phthisie Pulmonaire, 8vo. Paris. An. viii. See also Broussais, Phlegmasies Chronique, Tom. ii.

The pulse was 120, soft, but of good strength ; countenance flushed, and a little livescent ; two motions ; cough abated.

The treatment consisted of one small blood-letting at admission, to the extent of seven ounces, repeated local bleeding by means of leeches and cupping, blisters applied to the upper part of the chest, antimonials, pills of calomel, opium, and antimony, and, the urine being very scanty, with a mixture of tincture of foxglove, squill, and spirit of nitrous ether.

The breathing continued to be very frequent and laborious, with increased livescence of the face, blueness of the lips and nails, and inability to lie in the horizontal position ; and death took place without delirium, on the morning of the 7th of January.

From the extreme difficulty of breathing, and the great distress which any change of position caused in this patient, it was impracticable to examine the chest and the motions of respiration by mediate auscultation so fully as was desirable.

The lungs were inspected on the 10th, and the following appearances found.

The body was not much emaciated ; the fat was in considerable abundance ; and the muscles of the chest were red and fleshy. The whole of the *pleura* of the left lung adhered to that of the ribs by firm, thick, false membrane, so closely that the lung could not be removed without tearing off the *pleura costalis*. In removing the lung in this manner, a small cavity at the apex of the lungs was broken open ; and this was then found to consist of several minute irregular cavities filled with dirty bluish-coloured matter.

The whole substance of the lung was most extensively occupied with minute granular tubercles disseminated through the pulmonic filamentous tissue. Towards the superior and central region of the lung, the pulmonic substance was consolidated, inelastic, and uncrepitating, and bloody serum issued in large quantity from incisions. Some parts were brownish-coloured, and others almost black.

The bronchial tubes were filled with dark-coloured puriform fluid, which escaped in great quantities from these tubes when divided. The mucous membrane lining these tubes was also much reddened, and in some parts embrowned.

The margins of the lobes were emphysematous.

The *pleura* of the right lung was natural and free from adhesions; but when the substance of the lung was pressed, it was found to be occupied by minute hard bodies, disseminated through the lung in almost every direction indiscriminately.

The substance of the lung when divided showed these bodies to be minute grains like large gunpowder grains, separately disseminated, and not aggregated in masses. The substance of the lung was dark-red or brown, firm, inelastic, and emitted when divided considerable quantities of bloody serum mixed with air-bells. Some portions were brown and almost black, and contained this fluid very abundantly.

The bronchial tubes discharged much dark-red puriform mucus, which completely filled their cavities, as well as those of the pulmonic vesicles. The bronchial membrane, when this was removed, appeared red and rather thickened; and the filamentous tissue surrounding these tubes and vesicles was reddened, consolidated, and loaded with bloody serum or actual dark-coloured blood.

The right chambers of the heart were greatly distended by blood, semifluid, and in clots; the left chambers were not particularly changed.

Permission was not obtained to inspect the organs of the other cavities.

I have been induced to submit to the Medico-Chirurgical Society this case with the preceding one, because my friend, Dr Alison, who witnessed the dissection of the lungs of the female, Helen Crawford, was of opinion that the symptoms and necroscopic appearances afforded strong confirmation of the justice of his opinion regarding the inflammatory origin of pulmonary tubercles. He was led to entertain this opinion chiefly from the recent origin of the woman's complaints, their rapid progress, the extreme urgency of the symptoms, and the speedy termination. As I feel it difficult to adopt this view, I think it proper to add a few words in explanation.

According to the woman's own statement, the symptoms of pulmonary disorder commenced only four months before the time at which she applied for admission to the Hospital,—a period much shorter than the ordinary duration of genuine tubercular disease of the lungs. The symptoms during life, and the appearances after death, showed that, though the lungs were occupied with tubercles, there was also inflammation, both of the substance of the lungs and of the bronchial membrane.

This inflammation Dr Alison regards as the cause of the tubercular deposition. But I think that it is more consonant with the phenomena in this case to believe, that it was either an effect; or, at most, a concomitant and coincident circumstance. According to the account given by the patient, her health was good previous to the accession of the symptoms of catarrhal and pneumonic disorder. The symptoms under which she laboured, which gave the peculiar character to her disease, and which contributed to the fatal termination, were symptoms neither of tubercular deposition nor softening, but of peripneumonic and bronchial inflammation. It is extremely rare, I may almost say it never happens, that the presence of tubercles induces rapid and laborious respiration with the mucous and subcrepitous rattles combined. When these symptoms take place, it is chiefly from the presence of bronchial inflammation succeeding to tubercular deposition, or accidentally combined with it.

I would merely propose a question as to the co-existence of the two phenomena in the same case; viz. an extensive dissemination of minute grandiniform tubercles, and the existence of bronchial inflammation and its products. Is it not reasonable to think that the tubercular deposition had existed for a considerable time before the symptoms of acute or subacute bronchial inflammation appeared, and that the presence of this deposition not only acted as a predisponent cause to the production of the bronchial inflammation, but tended to give that disease its obstinate, inveterate, intense, and incurable character in the present case?

Did the symptoms of anxious and laborious respiration and *orthopnœa*, with inadequate aëration of the blood, not depend rather on the bronchial inflammation than on the presence of the tubercular dissemination?

Did not the rapid progress of the disease and the fatal termination, with little comparative wasting, indicate rather the effects of the bronchial disease than of the mere dynamic disorder induced by the presence of tubercular deposit?

7. *Case of Pulmonary Tubercles, fatal in the first stage of the disease.* By Dr Alison, Professor of Institutes of Medicine, &c.

The following case is one of tubercles in the lungs fatal in their first stage, when hardly any of them had suppurated, and agrees in its leading features with several others which were formerly laid before the Society, (see their Transactions, Vol. ii. p. 287), as being, in my judgment, of peculiar importance in reference to the question, whether the deposition of tubercles is, in any case, a result of inflammatory action. It is a case of a young man engaged in a laborious occupation, by which his strength and breath are daily tested; who enjoys good health up to a given time, when he is exposed to the usual causes of inflammation, in a high degree of intensity; who is seized with cough, with *dyspnœa*, and the usual symptoms of inflammation within the chest, and is relieved by the usual remedies; he is again repeatedly exposed to the same causes; his symptoms, which had never entirely left him, are aggravated, and from this time these symptoms, and particularly the *dyspnœa*, continue unabated, and even progressive until his death. Now, on dissection, while there are the usual marks of inflammation on the *pleura*, the morbid appearance in the substance of the lungs,—the only appearance which is adequate to explain the continually progressive, and ultimately fatal *dyspnœa*, is a great tubercular deposition; the tubercles so numerous, in so early a stage, and in so uniform a state, that they must have been formed subsequently to the well-marked exposure to cold, and the accession of febrile and inflammatory symptoms; and the other appearances such, that, unless we suppose the repeated application of the causes commonly producing inflammation of the chest, to have excited the growth of the tubercles, we cannot understand how they should produced the fatal illness; and must regard the rapid growth of the tubercles, and the frequent application of the causes, as well as the constant presence of the symptoms of inflammation, as a merely accidental coincidence.

It would, indeed, be absurd to assert, that an attack of inflammation is the only condition necessary to the developement of tubercles in the lungs. It is plain that some additional predisposing condition must be present, probably in the nature of the blood, perhaps in the structure of the lungs, to determine this peculiar effect to result from the inflammatory attack. But, whatever be the nature of the predisposition, we have good reason to believe that, as existing *per se*, it is not necessarily followed by the developement of tubercles; and the principle which it is practically important to establish is merely this, that, by an inflammatory attack inadequately opposed, a tendency which was previously compatible with the healthy exercise of all the functions of the lungs,—which was imperceptible, and, for any thing we can learn to the contrary, might have remained inert,—may be so excited and exasperated as to lead to such a deposition of tubercles, as may be inevitably fatal within a few weeks.

Gilbert Farquhar, aged 22, admitted 23d August 1834,—a sailor,—stated distinctly that his health had been very good till fourteen weeks before admission,—when, being on the American coast, he had been much exposed to cold and wet when exhausted by fatigue. He had then febrile symptoms, cough, pain of chest and *dyspnœa*, and was bled with relief. Seven weeks before admission, his vessel had left America for England, and in consequence, as he believed, of fresh exposure and exertion during the voyage, his complaints were aggravated,—the *dyspnœa* became more urgent,—the pain of chest more general and severe, the cough increased, and the expectoration became more viscid and opaque, though never discoloured with blood. He then became somewhat emaciated, his febrile symptoms took somewhat the form of hectic, and his feet swelled.

. Seven days before admission he had landed at Leith, and been bled, and taken medicine without relief;—he had also got drunk, and been out at night and exposed to cold, within that time.

On admission he had pretty severe and very frequent cough, with scanty, mucous, slightly discoloured expectoration, pain of breast increased by the cough, difficulty of lying on either side; his respirations were 48 in the minute, heaving and oppressed; his pulse 114, soft; skin rather hot; face flushed and somewhat livid; tongue slightly furred, moist, with thirst.

The chest heaved imperfectly on both sides on inspiration; the sound on percussion, pretty natural anteriorly, was dull on both sides in the posterior and lateral parts.

The sound of respiration was harsh and bronchial, and attended with subcrepitous râle, generally over the chest, and there was distinct resonance of the voice in the upper part of both sides.

His urine was scanty and somewhat coagulable by heat.

He had leeches and a blister, and was put on the use of calomel and opium, and digitalis. His cough abated, but his pulse became more frequent and feebler, his tongue dry and florid, his breathing very frequent, and he became delirious with tendency to stupor, rallied a little under the use of wine, but sunk finally on the 26th,—the fourth day after admission.

Dissection.—The *pleura costalis* and *pulmonalis*, on both sides of the chest, were firmly and generally united by lymph highly organized; in the lower and lateral parts of the chest, this substance was nearly one-fifth of an inch thick, and part of it had a somewhat fibrinous appearance. When freed from their adhesions, the lungs did not collapse, they felt firm, and on being cut into were found very uniformly thickly studded throughout their whole substance with small tubercles, of the size of pretty large pin heads; the only portion of lung free from this deposit was a small part at the lower end of the right lung, which was very vascular and somewhat dense. The portions of lung immediately adjoining the tubercles appeared very vascular, but in general not condensed. In the upper part of the right lung were two or three very minute cavities.

There was a considerable quantity of serum in the *pericardium*, but no disease of the heart.

The liver was much enlarged, with hypertrophy of its gray matters, and the cortical portion of the kidneys was slightly affected with a similar deposition of grayish lymph.

8.—*Cases of Pericarditis.* By Archibald Inglis, M. D. Fellow of the Royal College of Surgeons, Edinburgh.

I am induced to lay the following cases before the Society, chiefly on account of the obscurity attending their progress, and the absence of some of those symptoms usually considered characteristic of pericardial inflammation.

Case I.—Mrs W., aged 69, an inmate of the Trinity Hospital, subject for some years previous to her death to a chronic catarrhal affection, occasionally assuming in winter an acute form, was suddenly seized in August 1832, while stooping to spread out some clothes on the ground, with an acute pain of the chest, almost immediately followed by syncope, and she was with difficulty conveyed to her apartment. When I saw her about an hour afterwards, the fainting had gone off, but she still complained of severe pain in the situation of the *sternum*. The pulse was 80, rather small, but sharp, and quite regular; considerable cough and *dyspnœa*, but not to a greater extent than I had often seen her suffer from her ordinary bronchitic affection. The tongue was foul, with loathing of all kind of food.

A blister was applied over the *sternum*, and mild laxatives and expectorants given, by which treatment the pain was removed, and the other symptoms much mitigated. About ten days after, she had again an attack of fainting, and pain of chest, and expired before I reached the Hospital.

On dissection, the *pericardium* was found adhering in many places to the heart. The adhesions were easily separated, and exposed the membrane of a florid red colour. The spaces between the adhesions were filled with turbid serum, with loose shreds of coagulated lymph floating in it. The only other morbid appearance was an adhesion of the right *pleura*, evidently not of recent formation.

Case II.—A shoemaker's apprentice, aged 17, feeble and emaciated in his appearance, had an attack of pleurisy of the right side two years previous to his fatal illness. From this time till within ten days of his death, he continued weak, easily caught cold, and his appetite was much impaired, but he had no severe indisposition. He was then seized with pain and tenderness of the right *hypochondrium*, felt chiefly below the margin of the ribs, increased on pressure. He was bled, and took some castor oil, by which he was much relieved. The dispensary pupil who attended him at this time left town, and the relations of the patient, not entertaining any apprehension, did not again apply till a week after, when I found him in a dying state. Pulse feeble, and intermittent; extremities cold and œdematous; breathing laborious, requiring the erect posture; countenance and lips pale. He died in the course of the night.

Dissection.—The cellular tissue throughout the body was slightly infiltrated with serum. On removing the *sternum*, and endeavouring to open the *pericardium*, it was found strongly adhering to the heart. Before reaching the muscular substance of that organ, two distinct layers of a tough yellow membrane were divided, each more than a line in thickness. These two layers were connected together by another about the same thickness, not so tough, and of a gray colour. The whole anterior part of the heart exhibited this triple covering, probably consisting of two layers of thickened *pericardium*, with an intermediate one of organized lymph. Posteriorly, the adhesion was only partial, and more easily separated, and then exposed a bright red surface as observed in the former case, some turbid serum being also found where the adhesions were incomplete. There was a pretty extensive adhesion of the right pleura.

The appearances of recent inflammation exhibited at the posterior part of the pericardium, were evidently connected with the symptoms which occurred during the patient's last illness. But the previous history of the case gives us no clue to find out at what period the adhesions of the anterior part had taken place, though they had probably existed for a considerable time, and in connection with disease of a chronic character.

CASE III.—In the case I have next to relate, the affection of the *pericardium* was complicated with *empyema* and extensive disease of the lungs and abdominal viscera, which, of course, contributed to modify the symptoms, and render the complaint more obscure.

J. S., aged 42, of sedentary habits, and frequently subject to dyspeptic symptoms, about four years previous to his last illness, had a severe attack of that description, during which it was observed that his pulse was occasionally irregular and intermitting. As, however, he had then no other indication of disease of the chest, this symptom was attributed to sympathy with the stomach. He got gradually better, and though obliged to be cautious as to diet, he enjoyed tolerable health until April 1833, when he was attacked by the influenza, then prevalent. He at first paid little attention to it, and even continued to go out for some days, until, finding he was getting daily worse, he sent for me. I found him affected in the usual way, with slight febrile symptoms, cold in the head, and a sense of weight and oppression at the chest, not, however, to such an extent as to prevent full inspiration, nor accompanied by any pain, and he had but little cough. By confinement to bed, and the usual treatment for influenza, the symptoms subsided in a few days. This improvement did not continue long, and though he had no fresh febrile paroxysm, a permanent quickness of pulse was soon observed; his breathing became easily hurried, especially on attempting to go up stairs; and his appetite continued much impaired, with feeling of extreme distension of the stomach after meals. He was now advised to try change of air, and, being unable for any long journey, he removed to Newington.

No improvement followed this change, and every attempt to take exercise in the open air seemed to aggravate the former symptoms, to which a severe cough, with scanty expectoration, was now added. The pulse when not excited by the stimulus of food or exercise kept steadily about 120, very feeble, but in general free from irregularity. The skin was cold and clammy; the countenance and lips were pale; the left side of the chest at its lower part now gave a dull sound on percussion, and the respiration was but feebly heard in it, while its circumference became evidently larger than that of the right side. He became very much emaciated, and was now almost confined to bed, lying on the left side only, with his head very low, feeling that the easiest posture.

A variety of pectoral remedies were given, and persevering counter-irritation kept up on the affected side, with occasional blisters to the right *hypochondrium*, where there was also fulness and uneasiness below the margin of the ribs. Under this treatment considerable improvement took place. He was again able to sit up, took a moderate meal with relish, and at length began to go out a little without being the worse for it. The left side of the chest also again diminished to its natural circumference.

About this time, however, he had two or three attacks of fainting, each followed for some days by much debility, and a feeble and irregular pulse. In October, he returned to town, and his complaints continued for some time nearly stationary. As winter advanced, however, he gradually lost strength. *Œdema* commenced, and gradually extended upwards. Fluid was also effused into the peritoneal cavity, the uneasiness produced by which was aggravated by frequent attacks of tympanitic distension of the upper part of the *abdomen*, accompanied by severe pain and increased difficulty of breathing. He was again confined to bed, and sloughing soon occurred over the left *trochanter*. He sunk rapidly, and died on the 19th February 1834, being about ten months after his attack of influenza.

On inspecting the body, the following appearances were found. The *abdomen* was distended with fluid; many patches of very dark-coloured *ecchymosis* were observed on the *peritonæum*; the pyloric orifice of the stomach was so much contracted as scarcely to admit the little finger, but without induration;

the mucous membrane of the stomach was very vascular; the liver slightly enlarged, and much gorged with blood.

The right side of the chest was resonant; the left was dull and *smaller* than the right. The left cavity of the chest was filled with greenish serum, and lined with a layer of coagulable lymph, flocculent on its surface. The left lung was firmly bound down to the *mediastinum*, and a band connecting it to the diaphragm, its substance being thus compressed into a flat cake of dense but pliant texture. About three pounds of yellow serum were contained in the right cavity of the chest.

The *pericardium* was firmly adherent to the heart throughout its whole extent. The adhesions were firmest where there was least appearance of interposed lymph. The *parietes* of the heart slightly increased in thickness.

9.—*Case of Adhesion of the Pericardium to the Heart, of long standing, with the supervention of œdema of the Lungs, which terminated fatally in a few hours.* By WILLIAM THOMSON, M. D. Fellow of the Royal Colleges of Physicians and Surgeons of Edinburgh.

Mr W. aged 32, head clerk in a writer's office, had consulted my father occasionally on account of dyspeptic symptoms, and had been for some time under my own care on account of an inflammatory affection of his eyes. But a few weeks previous to his death, he had consulted me about some other small local ailment. The night previous to his death, his brother and he sat up to a later hour than usual, engaged in agreeable conversation respecting the fair prospects in life that seemed to be opening before them. About five o'clock in the morning of 19th February 1829, Mr W. awoke with a painful sense of oppression at his chest, from which he sought to obtain relief, by assuming the erect posture. The oppression continuing, I was sent for about seven o'clock. I found him sitting on a chair near the fire, breathing laboriously. The air inspired and expired produced a very audible gurgling noise, obviously in consequence of its passing through a fluid in the *trachea* and *bronchi*. On applying the ear to the back of the chest, a similar noise was heard in the lungs. He from time to time coughed up a small quantity of this fluid, in a very frothy state. In a few moments he said he could no longer remain in that situation, and walked with little assistance, several paces to his bed. His breathing became more and more laborious, and in the course of a short time he ceased to make any more attempts to cough; his pulse became gradually feebler, and about eight o'clock the noise of his respiration ceased.

Dissection.—The cavity of the thorax contained a large quantity of reddish serum. The *pericardium* adhered firmly to the heart throughout its whole extent. The heart itself extended a considerable way into the right side of the chest. Its left ventricle was much thickened in substance, and its capacity greatly enlarged. The whole substance of the lungs was infiltrated with serum in very large quantity, but they were crepitating throughout, no part of them being hepatized or tubercular.

I have been favoured by the brother of the patient, himself a medical practitioner, with the following statement respecting his previous ailments.

" J. W. was, during his infancy and boyhood, of a very delicate frame and habit, although subject to no particular disease. At the age of 13 he was bound an apprentice to a writer in Forfar, where he continued for upwards of four years, and then removed to Edinburgh. During the period of his apprenticeship he was much annoyed with dyspeptic symptoms, which were not lessened after his removal to Edinburgh. In the beginning of the year 1817, upon getting out of bed early one morning, he was suddenly seized with a fit of syncope, and fell on the floor, where he lay unconscious for a considerable time. During the next four years, with the exception of a continuance of his dyspeptic complaints and delicate habits, I can recollect no particular illness to which he was subject. At the end of this period he was attacked with a severe inflammatory complaint in the chest, for which he underwent the most active antiphlogistic treatment, under the care of Dr Spens, who, I was given to understand, regarded his disease as *pneumonia*, and for some considerable time despaired of his life. Ultimately, however, he so far recovered as to be able to bear removal to the country early in the summer of 1821, much emaciated, and labouring under severe cough, accompanied by purulent expectoration and profuse night sweats. He was now placed under the care of Mr George Hull, surgeon in Forfar, and was considered by him as consumptive. He continued under Mr Hull's care for nearly two years, during which time he used internally, digitalis in powder, tartrate of antimony in solution, and hydrocyanic acid, living almost exclusively upon milk and vegetables, while externally a blister was applied over the *sternum*, and kept open for many months by savine cerate. His pulse during this period was never under, although frequently above, 90, the cough and oppression of breathing, particularly on exertion, were harassing, and the expectoration and night perspirations continued profuse. On one occasion while I was beside him, he was threatened with a renewal of his inflammatory symptoms in the chest, but a timeous abstraction of blood gave immediate relief. Towards the end of the year 1822, having got considerably better of his thoracic complaints, he again returned to Edinburgh, and resumed his duties as a clerk in a writer's office. From this period up to the time of his death, although he still continued delicate, and was apt after exposure to cold, or from over fatigue, to be laid up for a day or two at a time with accessions of his pectoral symptoms, yet, upon the whole, his general health was surprisingly good. He was latterly considerably annoyed with attacks of inflammation of the eyes, with *dyspepsia*, and with toothach, and during the last year of his life he complained of pains about the *scapula*, shooting downwards, and of a general sense of coldness, which made him declare that the only comfortable place in Edinburgh was the Register-office, where the temperature of the rooms is always kept high by large stoves. So particular had he become on the subject of heat, that, a short time before his death, he provided himself with a thermometer for the purpose of regulating the temperature of his sitting room, and during the attack which cut him off, he urged his friends to heap fuel upon the fire, declaring he could not survive without an increased temperature. In conclusion, I may remark, that he never complained of palpitation of the heart, nor of pain specially referred to its region, but was at all times easily rendered breathless on exertion."

10. *Two Cases of Pericarditis of long standing, which terminated suddenly by Suffocation.* By DAVID HAY, M. D., Fellow of the Royal College of Surgeons, Edinburgh.

Dr HAY mentioned to the Society, that he had seen two cases of *pericarditis* of long standing, which terminated suddenly by suffocation.

The first that of a man of 27 years of age, very robust, of dissipated habits, and liable to attacks of acute rheumatism, for which he required the free use of the lancet and other antiphlogistic remedies. The attacks in his joints were occasionally accompanied by oppression of the chest, which was relieved by bleeding.

The night before he died, he had gone to bed in his usual health, but, early in the morning, his breathing was observed to be remarkably oppressed, the whole chest and *epigastrium* heaving and undulating, especially the left side; his pulse was rapid, but soft and feeble, and there was evidently much mucus in the air tubes, producing noise in his breathing. Dr Hay saw him immediately, and found him moribund; he opened a vein, and applied other remedies without success, and he expired shortly after his arrival. On examination of the body, the *pericardium* was found almost universally adhering to the heart, and so strongly, that it could be detached only by the knife. The heart was large, especially the left ventricle, and the lungs were loaded with mucus; the *pleuræ* adhered in many points on both sides of the chest.

The second case was that of a woman of 52 years of age, of whose habits or previous complaints Dr Hay knew nothing. She had left her own house in the Calton to visit and drink tea with a friend at the west end of the New Town. On her return home she was attacked with extreme oppression of breathing, and was obliged once and again to stand still, and sit down on the steps of the houses of the street, and at length became so ill that she was carried into an hotel at the east end of Queen Street, where Dr Hay saw her immediately. She laboured under great anxiety and oppression of breathing, finding it impossible to remain still a moment in any posture. There was continued loud mucous râle, and she occasionally expectorated some reddish fluid, her pulse was rapid and indistinct, and her surface covered with cold perspiration.

A mustard poultice covering the anterior part of chest, immersion of the feet in hot water, bleeding, ether, and ammonia, were resorted to without benefit, and she died in about twenty minutes after she was carried into the hotel.

On dissection, it was found that the heart adhered to the *pericardium* partially, and where non-adherent, its serous membrane was thickened by the effusion of lymph. The left ventricle was slightly enlarged. The lungs were gorged with reddish fluid of the same appearance with that which she expectorated previous to death.

11. *Case of sudden and unexpected death, in which the Heart had only a single Coronary artery, the coats of which were studded with patches of cartilaginous and ossific deposition.*

By Dr W. Thomson.

Mr D. aged 49, was found dead in bed with his eyes closed, his arms by his sides, and every thing betokening his having died whilst asleep. Some years ago he suffered much from rheumatism, but had recovered, and was in the enjoyment of good health, fat and fleshy. He had had flying rheumatism in different parts of his body, at last settling in a leg and arm for ten days or a fortnight before his death, but complained of no other ailment. It was mentioned by one of his friends that he disliked walking fast.

Heart of natural bulk; depositions of bony matter at the roots of two of the aortic valves; a single coronary artery with bony and cartilaginous depositions, particularly hard at its mouth, and extending in small patches down its ramifications.

12. *Case of Diseased Thymus Gland.* By Alexander Hood, Esq. Surgeon, Kilmarnock.

The patient in this case was about 15 months old, apparently healthy, and of a full habit of body. It was observed first about four or five months ago, that when she was surprised or irritated, she was threatened with suffocation from some obstruction in respiration. In the course of the last three or four weeks she was seized with two or three fits, but in such a severe form, that respiration was for a brief period suspended. Her recovery from these attacks was rapid, and it seemed to leave no unpleasant consequences, for her appearance in every respect indicated a high state of health. On the 11th, while running on the floor, she fell, and suddenly expired in one of these fits.

N. B.—The child died in the fifth fit or attack.

Dissection.—There was no marked deviation from the natural and healthy appearance in the condition of the brain or its membranes. On opening the *thorax*, a small quantity of water was found effused in the *pleura* and *pericardium*. The *thymus* gland was examined with much care, and exhibited the following appearances. The thin and flat portion of the gland which usually expands downwards on the lungs was removed by absorption. One portion of the gland rested over and pressed upon the right subclavian vein; another part of it lay over the subclavian coming from the left side; while a portion of it in continuation of the part lying over the vein extended upwards and backwards, and passed behind and under the vein, so that the left subclavian had three-fourths of its trunk completely imbedded in the gland. * When the gland had been carefully removed by dissection, the vein at this place was obviously contracted. The weight of the gland was not ascertained; but when put into a measure-glass, it displaced five drachms of water. The gland when cut into contained a considerable quantity of cream-coloured fluid or purulent matter. The mesenteric glands were in a scrofulous condition, and contained also cream-coloured fluid or purulent matter, though in small quantity.

13. *Three Cases of Aneurism of the Thoracic Aorta terminating suddenly.* By John Gairdner, M. D.

1. On Tuesday the 25th February 1834, when visiting a woman labouring under typhus, I was requested to see her mother who had been taken ill. She was an old patient of mine, whom

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* See a series of cases on this subject in 5th No. of the Edinburgh Journal of Medical Science, p. 39.

I had frequently attended for nephralgic attacks, but in whom I never before observed any symptoms similar to what I am about to mention. Her age might be between 60 and 70, her person sluggish and corpulent. She complained of little else than weakness, but on feeling the pulse it was found to be feeble, and with only 31 or 32 pulsations in the minute. I recommended that she should have a little warm spirits and water, which she took with good effect; for she was better during the rest of the day till evening, when she again got into a low faintish state, with some feeling of palpitation at the heart. At six o'clock the following morning she was found dead in bed with her arms drawn up, and the hands approximating to each other on the anterior part of the chest. On the day following I examined the body. The heart was rather large, but not morbidly so ; its valves were all in good condition, and its structure in other respects natural. But the whole thoracic aorta was diseased. Its coats were thickened and in many parts ossified. It was very considerably enlarged in diameter throughout its whole course, but most especially at the arch, where it formed a large aneurismal dilatation. Some *calculi* were found in the left kidney ; and the *pelvis* of the right kidney, with the corresponding *ureter*, were much enlarged, the effect, no doubt, of the repeated attacks of *nephralgia calculosa*, to which she had been subjected during a series of years.

2. I remember to have met a case very parallel to the above a great many years ago. A poor man came to me to request that I would take the trouble to examine the body of his wife, who had died suddenly the previous night. I found on inquiry that both he and she had been given to habits of intemperance; that, at an early hour of the morning, the poor woman got out of bed to make water; that, as she did not immediately return to bed, the husband at last got up to assist her, and found her seated on the chamber-pot and dead. The neighbours began immediately to suspect him of having hastened her end, and this was the cause of his application to me. The only disease discernible which could explain her sudden death was a large aneurismal dilatation of the aorta at the arch. In the *uterus* there was a quantity of a preternatural excrescence filling up its cavity, loosely adherent to its *parietes*, and consisting of small granular bodies united by a very loose cellular tissue. The size of the *uterus* thus distended might be about that of an orange. The substance within resembled the pancreatic structure, and was probably of the nature of what is termed pancreatic sarcoma.

In Mr A. Burns' work on diseases of the heart, &c. p. 236-7-8, are related two cases of sudden death from aneurism of the thoracic aorta in young females in the earlier stages of pregnancy.

He mentions that, in four cases of sudden death from diseased heart, he found the *uterus* gravid; and that, in two others, death occurred during the menstrual period. The above case may be considered as illustrative also of the principle which Mr B. seeks to establish, that uterine irritation accelerates death in such cases. I find in the large collection of aortic aneurisms in the Museum of the Royal College of Surgeons, one case in which the individual died suddenly without rupture of the sac; and in this case the subject is a female. She was a patient in St George's Hospital at London, and her death was quite unexpected. No particulars of uterine affection are recorded. Perhaps the truth may be, that an irregular life, such as is proved to have been led by several of the subjects of these cases, gives a proneness at once to uterine irritation, and to those cardiac and aortic affections which are found in conjunction with it.

3. The next case was different from the two former in its mode of termination, and as the symptoms were not at first such as to make it possible to decide on its nature, it may perhaps be interesting to give some account of them, as they presented themselves in the earlier stages of the disorder. The gentleman who was the subject of the case was rather corpulent, and of a gouty constitution; and was about 40 years of age in December 1825, when he first consulted me about fits of palpitation at the heart, which occasionally seized him. For these I prescribed cinchona in substance, with apparent advantage: for he soon got in a great measure rid of them. He complained, about the same period, of pain in his back about the inferior angles of the *scapulæ*, extending from thence towards the right hypochondriac region. This pain became worse in the months of January and February 1826. He derived some relief from various remedies which I then employed, among which were warm fomentations, frictions with tincture of soap and opium, draughts of opium and colchicum, and detraction of blood. This painful affection continued ever afterwards to adhere to him. When severe, it in some degree affected his breathing, and rendered the more violent sorts of exertion distressing to him. He passed the greater part of the summer of 1827 in London. His urine exhibited a lateritious sediment, for which a medical gentleman there prescribed the internal use of *aqua potassæ*. It produced a favourable change on the state of the urine, and also, as he himself thought, an abatement of the pain in the back, which had been at that time severe.

In the autumn of the same year, when he came more immediately under my observation, his pain had become greatly aggravated in consequence of his exertions in business, and he appeared to dread that it might proceed from some cause of a fixed description. He was troubled, too, with a degree of *dysphagia*, which induced him to lean forward in the act of swallowing, as he had discovered by experience that when he did so, the food passed more easily into the stomach. Sinapisms, rubefacients, and gentle laxatives were the only remedies, so far as I remember, which I prescribed about this time. He was immediately after involved in a great deal of business with much personal fatigue, and repeated long journeys, and this exertion produced its natural effect,—a great aggravation of his symptoms. He was also seized with pain and *dyspnœa*, and was completely confined to his bed for some time. This happened in a distant part of the country. By the use of repeated bleedings, antimonials, and other remedies, the fever and *dyspnœa* were got the better of, and the pain greatly moderated. For the latter, his medical advisers recommended blistering, which gave him great distress, but produced not the slightest abatement of the symptoms for which it was prescribed.

At the time of his return to Edinburgh, on the 16th of November, he had still much pain of his back, especially towards the inferior angle of the left *scapula*; and he continued to suffer from the *dysphagia* already described. When in repose he had no *dyspnœa*; but this symptom was immediately roused by walking through his room; a peculiar wheezing sound was produced by a deep inspiration; an inclination of the spine forward, which was observable when I had last seen him, had obviously increased; he reclined habitually on a sofa with his back supported, and in this posture seemed perfectly easy. There was no remarkable pulsation to be felt about the chest or back, nor could this, or any irregularity in the heart's action, be detected by auscultation. Suspicions of the true cause of the disease were, however, suggested by the symptoms described; and repeated examinations were instituted with this impression; but as none of the indications were absolutely unequivocal, there was room to conjecture that some peculiar modification of his gout might possibly occasion his distress. The treatment adopted was suggested in part by this view of the case, and was in part directed to the alleviation of the pain and *dyspnœa*. Sulphate of quinine, valerian, and colchicum were prescribed on various occasions with very little apparent relief; cupping produced scarcely any beneficial effect; inhalation of vapour of hot water and ether draughts were prescribed for the breathing with little avail; sinapisms appeared to do more good than any other remedy, and were, therefore, very frequently resorted to, and almost always with some temporary relief.

Very little change took place in the general aspect of the case during the winter months; but about the middle of March the pain increased, with quick pulse, laborious breathing, and scanty urine, depositing a copious lateritious sediment. The pain became so intolerable that I was obliged to resort to a free bleeding followed by two cuppings, and afterwards by a blister. Towards the end of the month he had an accession of regular gout in the foot, which lasted for several days. He was able to leave his bed early in April, and, by the 9th of that month, so great an improvement had taken place in all the symptoms, that he was enabled to walk about the house with a degree of facility to which he had long been a stranger, and to go out several times both on foot and in a carriage. But although the pain never again became so acute as it had been, the period was rapidly approaching when the disease was to terminate fatally. On the 18th April, he was suddenly seized with *hæmoptoe*, and brought up five ounces of blood, which coagulated speedily,—if, indeed, it was not coagulated at the moment of expulsion, which is probable. Its expulsion was preceded by a pretty acute sensation of pain in the left side of the chest; but both the discharge and the pain ceased in a few minutes, and in the afternoon he assured me that he had no sensation calculated to remind him of the occurrence. On the 30th April, the *hæmoptoe* recurred, and put an end to his life in about seven minutes.

On dissection the air passages and cells of the lungs were found loaded with blood, especially those of the left lung, from which the air appeared to be in a great measure expelled by the blood which occupied its place. The whole thoracic *aorta*, ascending and descending, was enlarged to two or three times its ordinary dimensions. In the descending portion, two small aneurismal *sacculi* were observed, each large enough to admit the point of the finger, with parietes much thinner than those of the rest of the vessel. The larger of these had adhered to the left *bronchus*, and had burst into it through the adhesion. A small coagulum of blood was found partially closing the aperture, and closely adhering to its upper margin. Its under margin was non-adherent, and at this part a full-sized probe could be easily passed from the *aorta* into the *bronchus*. It is evident that the coagulum had been the cause of the cessation of the first attack of hemorrhage, twelve days before the fatal one. The other vessels arising from the arch were sound.

14. *Case of Aneurism of the Aorta producing only symptoms of Laryngitis.* By Robert Graham, M. D. &c. &c.

The whole symptoms of the following case were the everyday symptoms of *laryngitis*. Nearly the whole of the diagnostics of aneurism were awanting, till the occurrence of the fatal hemorrhage, and even now that I know the real origin of the symptoms, I can see none, excepting this last, which is not more naturally explained by the supposition of the *larynx*, rather than any other organ, being the seat of the disease. The disease was therefore treated as *laryngitis*, by repeated leeching, laxatives, warm bath, draughts with ether and laudanum, nauseating doses of tartrate of antimony, inhalation of steam, blistering and warm poultices to the *trachea*, confinement to bed; and the relief which followed the treatment tended to continue the deception.

There cannot possibly be an explanation of the symptoms, but, by supposing them to be produced partly by the approaching rupture through the *trachea*, but chiefly by pressure on the nerves supplying the *glottis*; and the principal value of the case seems to be the proof which it gives that such symptoms may attend tumours in the situation occupied by the aneurismal sac here, and that, therefore, our diagnosis, even when formed upon a crowd of evidence without one contradictory symptom, may occasionally be mistaken.

Peter Anderson, aged 36, of middle size, robust, healthy and active appearance, admitted into the Royal Infirmary, 12th December 1834, states that he had been an extremely healthy man until the middle of August last, when, after a day's severe labour, the weather being very warm, he was seized with hoarseness, accompanied with diffused pain over the anterior part of the chest, *cardialgia*, and vomiting after taking food. Three weeks after he was blistered on the chest without relief, but all the symptoms, except the hoarseness, abated after the application of ointment of the tartrate of antimony. He was then blistered along the *trachea*, and the surface was dressed with cantharides ointment for two or three hours daily, during thirteen days, but the hoarseness continued without alleviation. About a fortnight ago he was seized with difficult respiration, and sense of constriction in the windpipe. Four days before admission, while walking through the fields, the weather being cold and windy, the oppression of breathing gradually but rapidly increased, obliging him frequently to sit down, and at last, while sitting, he became insensible and fell upon the ground. He was found in this state about an hour afterwards, his face livid, and the pulse at the wrist gone. His consciousness gradually returned after he was placed in a warm bath, and after expectorating some blood, his breathing became more free, but the expectoration has ever since contained a little blood. Slight cough; respiration much oppressed on the slightest exertion, loud and stridulous; has pain and uneasy sensation on applying pressure to the *larynx*, but no pain of chest on full inspiration. Occasional uneasiness of throat.

but at present no difficulty of swallowing; complains of pain in circumscribed portion of left parietal bone; pulse 80, rather full in right arm, weaker in left; bowels rather bound; tongue whitish; is free from thirst.

After admission into the hospital, it was found that the violent attacks of *dyspnœa* were always easily produced by the slightest exertion, were accompanied with some degree of livor of countenance, and were often almost instantly removed, or at the least were greatly alleviated, by breathing hot air, as from the door of a stove, or by inhaling steam. During sleep the respiration was sometimes, at least, perfectly natural. The pulse varied from 80 to about 130, according to his state of absolute rest, or trifling exertion, and was always full and firm at the right wrist, often perfectly natural. He had frequent starting on going to sleep,—rarely pain in his back and breast from cough, which sometimes occurred in severe paroxysms. The sputa were occasionally muco-purulent, generally containing some blood, and he felt easier on the days in which the quantity of this was considerable. The chest was found to be somewhat tympanitic in the middle of the right side anteriorly, and mucous, sonorous, and sibilous *râles* were occasionally heard. On the whole, his symptoms subsided very greatly, so that he was able to be out of bed for a great part of every forenoon, and during this time walked constantly about the ward without any accession of *dyspnœa*, or other inconvenience. In the night of the 5th of January, he was attacked with *diarrhœa*, and all his laryngeal symptoms were greatly aggravated next day, he believed, in consequence of exposure to cold in going to the water-closet, and these symptoms never again completely subsided. About eight in the morning of the 10th of January, when lying quietly, suddenly spit out, without any coughing, about one and a-half ounce of florid fluid blood, mixed with a small quantity of mucus, after which he slept for an hour, and during the forenoon, by coughing, brought up a considerable quantity of frothy mucus streaked with blood. He now felt better, his countenance being greatly improved, and the pulse 60, rather harsh, but otherwise natural; and he continued easy till two o'clock next morning, when he was suddenly seized with expectoration of fluid florid blood, which produced suffocation in a few minutes, the quantity lost being about two pounds.

Dissection sixty hours after death.—The *sternum* was raised, and the tongue, *larynx*, *œsophagus*, heart, and lungs were removed from the body.

The lungs did not fully collapse, and had on their surface some large rose-coloured patches. They felt doughy, and when cut yielded to pressure a quantity of frothy mucus. The *pharynx*, *larynx*, and *trachea*, contained much fluid blood.

The *larynx* and *trachea* were opened from behind by a continuous longitudinal incision; no inflammation or thickening were any where perceptible, nor was there the slightest appearance of *œdema* or effusion of lymph. On the left side of the *trachea* there were three elevated *papillæ* between as many cartilaginous rings, each having in its apex a small opening filled with a dark coagulum, but from which blood could be squeezed. These openings communicated with an aneurismal sac, about the size of a large walnut, arising from the arch of the *aorta*, unconnected with the origin of the ascending vessels, and lying parallel with the *trachea* on its left side. The left subclavian artery was impervious, its cavity having been obliterated by the pressure of the tumour.

15.—*Case of Thoracic Aneurism.* By Dr ALISON.

DR Alison communicated verbally the leading particulars of another case of thoracic aneurism, which occurred some years ago, where there were similar fits of urgent dyspnœa, with the crowing sound on inspiration, and where it appeared, on dissection of the parts, (which are preserved in the Museum of the University, and were exhibited to the Society,) that the recurrent nerve on one side had been stretched and flattened by the tumour; causing, probably, loss of its function, and consequent impossibility of voluntarily separating the arytenoid cartilages, or antagonizing the action of the *constrictors* of the *glottis*, when these were affected with spasm.

The patient was a middle aged man, who became a patient of the New Town Dispensary several years before his death, on account of dysphagia and fits of palpitation, and of violent fits of coughing, with crowing and difficult inspiration, in which his face used to become swelled and livid. He had also frequent paroxysms of violent pain shooting up the left side of his neck to the occiput.

His heart was found to be somewhat enlarged, and there was, after a short time, so obvious a pulsation beneath the upper part of the *sternum*, and between the cartilages of some of the upper ribs on the left side, that no doubt was entertained of the dependence of all these symptoms on an aneurism of the ascending *aorta*, or some of its larger branches. He was only effectually relieved by occasional bleedings.

After he had been nearly a year afflicted in this manner, and been repeatedly in the hospital, he had an attack of apoplexy, followed by complete hemiplegia, and by that curious modification of memory, in which the recollection of words is almost entirely lost, although the recollection of things and events, and the reasoning powers, are still tolerably entire. After this attack, and the evacuations which were practised on account of it, there was a remarkable amelioration of his former symptoms; the pulsations became less obvious; the fits of cough and *dyspnœa* much less frequent and severe; and the dysphagia and paroxysms of pain almost entirely left him. He lay a long time in the Clinical Ward in a state of hopeless palsy, was dismissed relieved, and readmitted after some months, on account, partly of increased debility and mental imbecility, but chiefly of a return of the paroxysms of pain, now felt in the *right* side of his neck, and of the fits of *dyspnœa* with crowing. A few days after his readmission, he died in one of those paroxysms of *dyspnœa.*

On dissection, an apoplectic cyst, corresponding to the hemiplegia, was found on the outer side of the *corpus striatum*, between it and the fissure of Sylvius. There was no other morbid appearance in the brain, but much effusion of serum beneath the arachnoid.

A large aneurism was found springing from the root of the subclavian artery on the left side, and extending under the *sternum ;* it was filled with layers of firm grayish lymph, quite freed from the colouring matter of the blood. On the right side, a much smaller aneurism, filled with recent coagula of blood, was found likewise arising from the root of the subclavian artery. The contents of this small and recent aneurism were so soft that they fell to pieces on removing it from the body, and the disposition of the nerves in regard to it could not be traced ; but on the left side both the *par vagum* and recurrent nerve were found stretching round the tumour, and compressed and flattened by it; and this appearance is still distinct in the preparation.

It is important to observe, also, that in this case the left carotid artery is completely obliterated, and the left subclavian diminished in calibre by the pressure of the aneurism. The diversion of the course of the blood thus effected had probably been the cause of the stationary condition of this larger aneurism, and of the great abatement of the symptoms connected with its growth,—which had been observed during many months before death.

16.—*Case of Obliteration of the Vena Cava Superior at its entrance into the Heart.* By John Reid, M. D. President of the Royal Physical Society of Edinburgh.

During the course of last month, (December 1833,) the *vena cava superior* was observed to be obliterated at its entrance into the heart, in one of the subjects in Dr Knox's Practical Dissecting-Rooms. This obliteration was about two inches in extent, and formed, in the usual situation of the vein, a rounded cord of a cartilaginous feel, firmly connected to the surrounding parts, particularly to the anterior surface of the right *bronchus*, at the division of the *trachea*, by firm cellular tissue. Around it, particularly at the lower part, were several calcareous deposits, apparently connected with the bronchial glands. On the inner surface of the auricle, the entrance of the vein was only marked by a slight depression, and the auricle at this part formed a kind of digital pouch.

From the advanced state of the dissection when this circumstance was discovered, it was difficult to trace the channels through which the blood must have passed to the *vena cava ascendens;* but after a good deal of careful examination, some of these, and perhaps the greater part, were made out. The large veins at the root of the neck united in the usual way to form the *cava superior*, and this vein became suddenly impervious at the part already mentioned. On examining the *vena azygos*, it was found to be at least twice its usual size, and became suddenly impervious where it joined the obliterated *cava.* The right intercostal veins, particularly the superior, were much enlarged, and a vein of the size of a common quill passed between the *cava* immediately before its obliteration and the upper part of the *vena azygos.* The *vena azygos* was joined at the usual place, viz. about the seventh dorsal vertebra, by what is called the *vena demi-azygos*, which was more than twice its usual size. The state of the superior intercostal veins of the left side could not be ascertained, as they had been nearly all destroyed; but, to judge of their size from some remnants of them, they must also have been considerably enlarged. On blowing air down the *azygos* and *demi-azygos*, they were observed to retain their large size, as low as the *diaphragm*, and to form several flexuosities. The air passed freely along the enlarged intercostals and superior lumbar veins, distending all the lumbar veins, and filling the *vena cava ascendens.* The lumbar veins were also considerably enlarged. A vein of at least the size of a writing quill, formed by a branch from each of the *azygos* veins, passed through the left side of the aortic opening, and joined the *cava inferior*, near its junction with the renal veins.

The internal mammary veins had been destroyed, but the epigastric veins were of their natural size, so that there could not be any reflux of blood in that direction.

All the systemic venous blood of the body, except that of the coronary vein, being poured into the right auricle by the *vena cava inferior*, that vein was also considerably enlarged. At its entrance into the heart, it nearly admitted the passage of three fingers. The *azygos* veins generally communicate with the renal veins, but whether this communication existed, or was enlarged, could not be ascertained, as the kidneys had been removed.

The condition of the vessels, as here described, was fully examined by Dr Knox and Mr Fergusson, who assisted in the dissection.

The exact manner in which the blood passed from the large vessels at the lower part of the neck to the enlarged intercostals which entered the *azygos* veins, could not be examined, as the dissection was too far advanced, but it is probable that a considerable part of it flowed through the intercostal veins, which empty themselves into the *venæ innominatæ*, and then passed through the anastomosing branches of these, with the intercostals which enter the *azygos* veins. Part of it might also have flowed along the internal mammary veins passed through the anastomosing branches of these with the intercostals and superior lumbars, and thus reached the *azygos* veins. The thoracic veins in the *axilla* might also have allowed a reflux through them, which, from their anastomosis with the intercostals, would also reach the *azygos.* The sinuses and veins within the spinal canal might also have assisted in this by their numerous anastomoses.

Though the *azygos*, intercostals, and lumbar veins were all enlarged, yet it was difficult to conceive how the whole of the blood of the *cava superior* could pass with the necessary facility into the *cava inferior*, particularly as it was a retrograde motion.

That there could be any other channel than those already mentioned through which the blood could pass between the two *cavæ*, it would be difficult to conceive.

The appearance of the parts around the impervious portion of the *cava* furnished no perfect clue to any supposed cause of its obliteration. It is, however, probable that the calcareous deposits around the vein were the remains of some enlarged bronchial gland, which, by their pressure upon the vein, produced its obliteration.

This subject was a female about 40 years of age, and died in the City Charity Work-House, under the care of Dr Smith, who has kindly furnished the following particulars of her case:

"A. B. was admitted into the Charity Work-House in July last, labouring under symptoms of *hydrothorax.* There was general *anasarca*, great difficulty of breathing, livid countenance, inability of lying down, scantiness of urine, pulse frequent, small, and irregular.

"She was relieved of these symptoms by the use of cream of tartar and other diuretics.

"Finding herself better, she left the House in September free from œdema, but shortly after her symptoms relapsed, and she was again admitted in October. The same remedies were had recourse to, but without producing any relief. She died rather suddenly under an aggravation of all the symptoms on the 30th November, having had neither delirium nor coma, though she was somewhat deaf.

"*Inspection.*—The right cavity of the *thorax* was full of serum, and the *pleura costalis* was much thickened. On the left side there were strong adhesions between the *pleura pulmonalis* and *costalis*, and the latter membrane was in many places fully three lines in thickness. The kidneys exhibited strong marks of Bright's disease. This woman had led a very irregular life."

I may also mention, as somewhat analogous to this case, that last winter, while dissecting the sinuses of the *dura mater*, I met with an obliteration of the superior longitudinal sinus, about its middle. I ascertained that in this case also there had been no cerebral derangement present during the last illness of the patient.

In contrast with this case, where the blood of the two *cavæ* was poured into the auricle by the inferior *cava* alone, we may mention another which lately occurred in the same rooms, where the greater part of the blood of the two *cavæ* entered the auricle by the *cava superior*.

The two primitive iliacs in this case, instead of joining to form the *cava inferior* in the usual place, continued to ascend separately, the one on the right, and the other on the left of the *aorta*, until they were joined by the renal veins. They then united a little to the left, and behind the *aorta*, to form the *cava inferior*. This vessel passed through the aortic opening, getting to the right of the artery, and took the usual position and course of the *vena azygos*, and like it, joined the *cava superior*. In this subject the depression on the inferior surface of the liver to the right of the *lobulus Spigelii*, for the *cava inferior* was awanting, and passing through the opening in the *diaphragm* for the *cava inferior*, we had a much smaller vessel formed by the junction of the hepatic veins, which took the place of the *vena cava inferior*, and, like it, opened into the auricle.

In this last case, the irregularity in the venous distribution evidently depended upon original formation, and is interesting as such;* while the two former apparently depended upon a change produced by disease on the original formation, and possess considerable interest both in a physiological and pathological point of view.

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* According to Meckel, the veins, particularly the internal ones, are seldom found to vary from their usual course, and in that respect differ considerably from the arteries.

I may mention, that the whole three subjects were females; the two first were about 40 years of age, and the last about 65.

17.—*Notice of similar Cases.* By Dr William Thomson.

The President, in communicating to the Society Dr Reid's case of closure of the superior *vena cava*, having expressed a desire to know what cases of a similar kind are to be found on record, and whether any information can be derived from these cases, as to the course which the blood pursues when its passage to the heart through this,—one of its ordinary great conduits,—is obstructed, I have consulted the authors by whom it seemed most probable that cases of this nature, or a reference to them, would be given, but have met with only three fully detailed instances of the occurrence, in works which I have had an opportunity of examining.

In all of these cases, the closure of the superior *vena cava* existed in connection with aneurism of the ascending *aorta*. In one of them the *vena azygos* was also obstructed, as had happened in the case described by Dr Reid. In the two others, this vessel continued open.

The first of the cases to which I refer is related in the inaugural dissertation of Dr Deckart, a pupil of the late Professor Rudolphi, which was printed at Berlin in 1823. It unfortunately happened that the obstruction of the superior *vena cava* was not discovered till the dissection of the body was completed, so that the following description of the state of the vein near to the heart, is taken from the preparation of the heart, and its adjoining vessels, after they had been detached from the rest of the body.

The superior *vena cava*, we are told, almost immediately adjoining to its entrance into the heart, was entirely closed, its coats adhering firmly to the sac of the aortic aneurism. With the exception of a branch situated at a very short distance from the auricular orifice of the *vena cava*, which adhered to the right side of the aneurism, and extended to the distance of about two inches in a nearly horizontal and somewhat flexuous direction, no vessel could be detected in connection with the venous trunk. This branch, the author conceives, must in all probability have been the *vena azygos*. The coats of the *vena cava* were so completely incorporated with the sac of the aneurism, that even on minute examination, it was impossible to discover the point at which they terminated. The area of the vein diminished, and its coats became gradually thinner, as it receded from the auricular orifice.

From the obliteration of the vein not having been discovered during the dissection of the body, the state of the other veins, and particularly of the jugulars and subclavians within the thorax, was not ascertained; and we are consequently left to conjecture by what lateral passages the circulation of the blood could have been maintained. Dr Deckart suggests three channels through which he conceives this might have been effected. 1*st*, Through the veins and sinuses within the vertebral canal, which communicate, above, with the subclavian, and, below, with the hypogastric or internal iliac vein. By these veins in a state of dilatation the blood, he alleges, might easily have flowed through the hypogastric and iliacs into the inferior *vena cava*, and ultimately into the heart. 2*d*, He thinks the circulation might have been maintained through the anastomoses of the veins on the upper and under surfaces of the diaphragm. And 3*dly*, Through anastomoses of the internal mammary veins, with the epigastric and abdominal. That, in the case under consideration, it was through the last of these channels principally that the blood found its way from the upper part of the body to the heart, Deckart is disposed to infer from the circumstance, that, on opening the chest, an unusually large quantity of blood flowed from all the veins that were divided, proving that their areas must have been considerably dilated.

The second case of closure of the *vena cava superior* to which I have alluded, is described by Dr Otto of Breslau, in the second part of his Rare Observations appertaining to Anatomy, Physiology, and Pathology, published at Berlin in 1824. In this case also, as I have already mentioned, there existed aortic aneurism, and this had proceeded to such an extent as to cause perforation of the *sternum*. The *vena cava superior* was compressed by the aneurism, and closed to such a degree that the finest probe could not be passed through it. The closure extended from the place where the *vena axygos* enters the *cava*, down to the auricle. The whôle of the blood of the upper part of the body must therefore, observes Professor Otto, have been conducted by lateral passages to the inferior *cava*, and in this way have flowed back to the heart. Accordingly, he found the *vena azygos* and the left internal mammary vein very much dilated, the right internal mammary vein being also obliterated by the pressure of the aneurism.

Case third. In the second volume of the Journal Hebdomadaire, p. 110, (for January 1829,) M. Reynaud has described a " case of almost complete obliteration of the superior *vena cava*, caused by the pressure of an aortic aneurism, with the developement of a collateral venous circulation."

In this case the superior *vena cava* was seated behind, and to the right of the aneurismal tumour; it was flattened, and in a great measure obstructed by a fibrinous coagulum, which, however, left a passage of such size as that a small column of blood could still arrive at the right auricle. At the place where the coagulum terminated,—that is to say, at about an inch from the insertion of the vein into the auricle,—the parietes of the vein were so much approximated, that they had contracted adhesions; so that the attempt to introduce the handle of a scalpel was rendered unavailing by bridles existing throughout almost the whole of it, with the exception of one point into which a female sound could be passed. These bridles were very well organized, and in texture analogous to those which are often met with, connecting the lung to the costal *pleura*.

During life the veins of the neck were observed to be swelled; the jugular of the left side exhibited, at its lower part, a bluish dilatation, into which the circulation appeared to take place very slowly if at all. The veins of the shoulders, particularly of the right, were very much enlarged and sinuous. On the sides of the chest they formed numerous anastomoses, which were joined by some veins from the *abdomen*, and particularly by the epigastric. M. Reynaud, in his account of the dissection, does not give any description of the collateral vessels by which the circulation was maintained; but in the reflections which he has annexed, he assumes that the blood of the upper parts of the body was in a great measure brought back to the *vena axygos* and the inferior *cava*, by anastomotic branches belonging to the thoracic veins, and the epigastric of the right side.

Mr Hodgson, in his very valuable work on the Diseases of the Arteries and Veins, states, that he is not aware that the *vena cava superior* has in any instance been found completely obliterated. M. Breschet, in his translation of this work, has mentioned, in a note, that, in the Museum of the Faculty of Medicine of Paris, there is a piece modelled in wax, under the direction of Professor Dupuytren, which represents a polypous concretion formed in the *vena cava superior*, and prolonging itself into the subclavian and jugular veins, which obliterates the canal of these vessels, to the parietes of which it adheres. This concretion, observes M. Breschet, is white, which leads to the belief that it was formed by fibrin.

Professor Lobstein, in the second volume of his Treatise on Pathological Anatomy, (Paris, 1833,) p. 609, refers to a case as being related in an inaugural dissertation, published at Munich in 1831, by Dr Weissbrod, in which the *vena cava superior* was so much obstructed by a solid fibrinous substance, of a grayish red colour, that it was impossible to introduce into it the smallest probe, or even air; and a complete obstacle was presented to the passage of blood through it, from as high up as the level of the thyroid gland, down to the right auricle of the heart. The vein formed a conical tumour, five inches in length, twelve lines in breadth at its base, and six at its apex, which compressed the two right pulmonary veins to such a degree, that they had become obliterated in consequence of the adhesion of their parietes.

It is to be regretted, that, in neither of these cases of fibrinous obstruction of the *vena cava superior*, as mentioned by Breschet and Lobstein, is any account given of the channels by which the blood from the upper part of the body was conveyed to the heart.

In addition to these cases of obliteration of the superior *vena cava*, Dr Otto refers in his text book on Pathological Anatomy to two others which are described in works that I have not had an opportunity of consulting. The one is given by Marjolin in his Inaugural Dissertation, (Paris 1808;) the other by Vertel, in the Fourth Report of the Transactions of the Society of Agriculture of Doubs. The latter case, it is mentioned, likewise depended on the pressure of an aneurismal aorta. From the work in which it is recorded, it seems probable that it occurred in a brute animal, and not in the human subject.

To assist us in conjecturing, and, when a suitable opportunity may occur, in ascertaining by what channels the blood from the upper part of the body finds its way into the heart, when the *vena cava superior* is obstructed close to its auricular orifice, it is desirable to ascertain in what manner the blood has been conveyed from the lower part of the body to the heart, in cases in which the *vena cava inferior* has been obstructed, so near to its auricular orifice as to preclude the possibility of the blood entering by this channel; since it seems not unreasonable to presume that in both classes of cases, the lateral communications will be the same.

Dr Baillie, in a paper inserted into the first volume of the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, (p. 127,) mentions that, in a woman brought to Windmill Street for dissection, "the *vena cava inferior* was found to be changed into a ligamentous substance, from the entrance of the emulgent veins, even to the right auricle of the heart. The cavity here was so entirely obliterated, as not only to prevent all circulation of blood through this part of the vein, but even in a great measure to prevent the admission of air by inflation. The blood being prevented from passing through the *vena cava inferior*, flowed into the lumbar veins, enlarging them gradually as that vein became contracted, till at length they were of a sufficient size to receive the whole blood, which returns by the *vena cava*. From the communication between the lumbar veins and the *vena azygos*, the blood passed into this vein, and was conveyed to the heart. It happened in this particular instance that there was an additional *vena azygos* upon the left side of the spine, so that the blood was conveyed more readily to the heart, than if there had been one *vena azygos*, as in ordinary cases. The enlarged veins were in some places thrown into *varices*, as must naturally take place under the circumstances we have mentioned."

M. Reynaud read to the Royal Academy of Medicine, in October 1829, a " case of obliteration of the *inferior vena cava*, and of a part of the *vena portae*, with collateral venous circulation," which is published in the fifth volume of the Journal Hebdomadaire, p. 173.

The subject of this case was a man affected with *ascites*, for which he several times underwent the operation of puncture, after which on each occasion the fluid effusion was very rapidly reproduced. This circumstance, along with the enormous size of the superficial veins of the *abdomen* and the chest, had excited a suspicion that there must exist some obstacle to the venous circulation within the *abdomen*.

On dissection, accordingly, it was found that the right branch of the *vena portae*, as well as all its ramifications in the right lobe of the liver (which was itself in a state of atrophy) were completely obstructed by a solid matter, that adhered very firmly to the parietes of the vessels, and which, on being divided, was found to resemble very much in appearance the yellow tissue of the arteries. The hepatic veins of the same lobe were closed up in a similar manner. The *vena cava inferior* itself was firmly obstructed, to the extent of three inches, from its entrance into the auricle, by a matter similar to that found in the *vena portae*. The parietes of the vessel were also very much thickened. Outside of the *vena cava*, above the entrance of the hepatic veins, there was found an irregular mass of the same kind of matter as that by which the veins were obstructed.

The left branch of the *vena portae* was filled with fluid blood, and its ramifications in the left lobe of the liver, as well as the corresponding hepatic veins, were much dilated. A collateral venous trunk opened into the *vena cava* quite close to the auricle. The enormous superficial veins, that had excited attention during life, arose from the epigastric veins, and ran to join the intercostals and axillaries ; these vessels were considerably dilated, as well as the *vena azygos* itself, which conveyed to the superior *vena cava* a part of the blood that ought to have entered the heart through the *inferior cava*. Lastly, an irregular trunk, formed of a crowd of vessels issuing from the liver or the neighbouring parts, opened directly into the right auricle, at the same time that the large coronary vein itself, which had acquired a size nearly equal to that of the crural, formed part of the adventitious anastomotic circle, and received many sub-diaphragmatic and other branches. The veins of the intestines were dilated, the alimentary canal contained a matter resembling coffee-grounds, the gall-bladder contained a puriform fluid, and the spleen was increased in bulk.

Even in cases in which the *inferior vena cava* is obstructed at some little distance from its auricular orifice, so that the branches which join it near its termination may still discharge the blood, which they bring through this channel into the heart, a portion of the blood from the lower part of the body may be conveyed to the heart through anastomosing veins having communication with the iliac veins below, and the *superior cava* above.

Thus Mr Wilson has related the appearances found in dissecting the body of a woman in whom inflammation had produced complete stoppage of the circulation of the blood in the large veins below the diaphragm, with the exception of those of the liver. Besides the *inferior vena cava*, the emulgent, the spermatic, the primary iliac veins, the external iliacs, until they had nearly reached the groin, and the internal iliacs, with most of their larger branches, particularly those which returned the blood from the *uterus*, had their cavities completely obliterated.

In attempting to ascertain, with accuracy, the principal channels by which the blood, usually returned by these veins, had reached the heart, Mr Wilson found that the anastomosing branches of the veins on the sides and back part of the *pelvis* were much enlarged, as were also those between the *vena saphæna major*, and the branches accompanying the deep-seated arteries passing through the *foramen magnum ischii* and the sciatic notch. Large communications were seen filled with fluid blood, between the *venæ pudicæ externæ*, and the lower branches of the *vena mesenterica inferior*, which was enlarged to treble its usual size.

The veins coming from the sinuses of the *dura mater* in the *theca vertebralis*, the sinuses themselves, and the veins entering them, were much enlarged, and the communications between them and the sacral and lumbar veins were, by the blood contained in them, rendered very apparent. The enlarged branches of the lumbar veins formed such easy communications with each other, as to allow a passage through them to a very large quantity of blood, which entered the *vena asygos* by the anastomosing branches of its lower part. This vein, although three times larger than it commonly is, was without the varicose appearance described by Dr Baillie. The emulgent and phrenic veins communicated largely with the lumbar veins, and the *vena axygos*. "By means, therefore," remarks Mr Wilson, "of the increased size of the veins which have been mentioned, and the enlargement of their anastomosing branches, the blood which had formerly been returned by the trunk of the *vena cava inferior*, in consequence of the complete obliteration of this vessel from the liver downwards, reached the heart by a more circuitous course, indeed, but with so little difficulty that no real impediment was occasioned to the general circulation. The blood passed from the *venæ pudicæ externæ* into the inferior mesenteric veins, and from thence to the *venæ portæ*; it circulated afterwards through the liver, and entered the lower part of the right auricle of the heart, by the very small portion of the *vena cava inferior* which remained pervious, viz. between the auricle and *venæ cavæ hepaticæ*. The remaining part, having reached the *vena azygos*, passed from it into the *vena cava superior*, and entered the same auricle from above." Mr Wilson refers to two similar cases he had seen in women dying after delivery.*

A similar case is quoted by Scarpa in his work on Aneurism, in which Mr Cline found in the body of a man, the inferior *vena cava* obliterated a little above its bifurcation, in consequence of a steatomatous tumour, which had formed in the cellular substance behind the *peritoneum*, and which occupied a part of the *pelvis* and lumbar region. Mr Cline remarked, that the epigastric veins were become as large as the little finger, and that the superficial veins of the *abdomen*, as well as the lumbar, and those of the internal cavity of the *abdomen*, were in a similar manner very much dilated. The internal mammary vein, which was likewise greatly enlarged, as well as the epigastric, with which it anastomosed, opened as usual into the superior *cava*, near to the origin of the subclavian veins; by which circumstance the venous blood of the lower extremities was poured into the superior *cava*, by means of the mammary vein, and into the inferior *cava*, by the lumbar veins, above the compression caused by the steatomatous tumour.†

To the Editor of the Edinburgh Medical and Surgical Journal.

Sir,—As from some mistake, the corrected copies of the papers, which the Medico-Chirurgical Society did me the honour to place among their Transactions, in the last Number of your Journal, were too late in being sent in, I have to request the insertion of the following corrections and additional observations. —I am, &c. JOHN REID.

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* Transactions of a Society, &c. Vol. iii. p. 65.

† Since the above was in types, I have met with another case of obstruction of the inferior *vena cava*, related by M. Reynaud, in the second volume of the Journal Hebdomadaire for 1831, p. 381. To that and M. Reynaud's other memoirs on obstructions of the large venous trunks, I beg to refer those who may be interested in this branch of inquiry.

The first injection of the fœtal blood-vessels, noticed in the remarks upon some of the peculiarities of the fœtal circulation, was performed not upon a fœtus of four months, but upon one between five and six months. The terminating words of the same paper should have been " by blood which has already made the circulation of the upper part of the body."

Additional Observations on the Fœtal Circulation. By JOHN REID, M. D. President of the Royal Physical Society of Edinburgh.

THE injections of the fœtal heart and vessels, detailed in the last Number of this Journal, go to confirm the opinion which Sabatier, from a careful examination of the structure of the parts, entertained of the use of the Eustachian valve. The observations of Sabatier, although approved of and illustrated by Bichat, seem scarcely to have satisfied the generality of anatomists and physiologists, that it could possibly prevent the intermixture of the two currents, in the manner he described, so that we frequently find this opinion referred to, as the supposed use of the valve; and in two of the latest works on physiology, those of Magendie and Dr Bostock, the use here assigned to it, is by the former strongly stated to be impossible, and by the latter, it is treated as a fanciful hypothesis. The careful examination of the fœtal heart *in situ* must tend powerfully to remove the scepticism which usually exists on this subject.

In the *first* place, after the right auricle has been laid open in a proper manner, we may observe that the *foramen ovale* does not exactly pass through the *septum* of the auricles, but is rather partly placed in a notch in the posterior and inferior part of the fleshy *septum*, and partly in the upper part of the *vena cava ascendens*, as it joins the superior *cava* to form the great *sinus venosus*. When we next examine the position of the Eustachian valve, running from the left of the entrance of the *vena cava inferior*, to the left side of the *foramen ovale*, nearly forming a septum between the entrance of the vein and the right auricle, we perceive that this valve prevents the entrance of the blood of the *cava inferior* into the right auricle, and directs it through the *foramen ovale* into the left auricle. And lastly, when we consider the entrance of the two *cavae* themselves, the superior passing downwards and forwards, the inferior upwards and backwards, and add to all this the thick upper margin of the *foramen ovale*, we further perceive that the blood, passing down the *cava superior*, must fall directly into the right auricle, to the left side of the Eustachian valve, and thus fill the right ventricle. The course which the currents take in passing along the *aorta* and pulmonary artery is confirmatory of injections of these arteries in the *fœtus*, made by Kilian.

The supposition, that the superior nutrition of the head and upper extremities over the lower, may be accounted for by the greater purity of the blood sent to the upper part of the body, does not appear, when stated in this general manner, to be borne out by facts. For example, both the suprarenal capsules and kidneys are supplied by the blood, that has already made the circulation of the upper part of the body; and yet we find the absolute size of the renal capsules and the comparative size of the kidneys, greater in the *fœtus* than in the adult. From the instances here adduced, it would appear, that there is no necessity for having recourse to an arrangement of this kind, for regulating the growth of the different parts of the *fœtus*, notwithstanding that its circulating fluids are less pure than after birth, and that the usual method of augmenting the quantity of blood sent to the part, when its nutrition is to be increased, which we find adopted, after the animal is enabled to maintain an independent existence, can apparently answer the same purpose during fœtal life.

To this the brain, however, may be an exception; and it is probable, that the peculiar arrangement of the circulation in the *fœtus* may have a reference to the supply of that organ. It is perhaps necessary that an organ so delicate as the brain, whose functions, at least in the adult, are so easily deranged by insufficiently aerated blood, should be supplied from a purer source than that which the two *cavæ* could furnish. For though the brain is in the fœtal state perhaps entirely a prospective organ, intended for an independent existence, yet we must suppose that its organization is from the first adapted to its independent state, and if this should be the case, it is highly probable, that imperfectly aerated blood, which would be capable of deranging its functions, would be little favourable to its perfect developement. It may be that this answers a similar purpose, though by different means, to the arrangements which G. St. Hilaire has described in the heart of the crocodile, the physiological condition of which approaches somewhat to that of the human *fœtus*, by which the brain and extremities are supplied with the best aerated blood, while blood less highly aerated is circulated among the other *viscera*.

An objection has been made to the application of these injections upon the dead *fœtus*, to explain the course of the blood in the living state. It has been said that an important element of the question has been omitted, by overlooking the influence of the vital contractions which circulate the blood. If, however, it be granted, that the position of the Eustachian valve is such as is usually described, and that it presents an obstacle to the entrance of the blood, passing along the *cava inferior* into the right auricle, while it directs it toward the *foramen ovale* (which these injections prove), it is plain that it must continue to do this, whether the fluid is set in motion by vital contractions, or by a syringe; more particularly as the auricles are quiescent during their filling.

I may here mention, that I am satisfied, from repeated dissections, that the usual description of the distribution of the umbilical vein of the *fœtus* through the liver is incorrect, and that the account of it given by Kilian, Dr Knox, and probably by others, is the proper one. The umbilical vein, after passing along the horizontal fissure of the liver as far as the transverse fissure, enters the left branch of the *vena portarum*; and from this left branch of the *porta*, generally directly opposite (though this varies a little) to the entrance of the umbilical vein, arises the *ductus venosus*, which passes backwards in the posterior part of the horizontal fissure, and enters one of the branches of the left hepatic veins before it joins the *cava ascendens*. If the umbilical vein be still described as dividing into two branches, it would be necessary to mention, that the branch which goes to the sinus of the *porta* supplies the left lobe of the liver; that it is never obliterated after birth, but afterwards becomes the left branch of the *vena portarum*; and, in fact, this is the view taken of it by Roux in his additions to the *Anatomie Descriptive* of Bichat.

Our notions on the circulation of the blood through the liver of the *fœtus* must remain the same whichsoever of the two descriptions we adopt.

Additional Observations on Phlebolites. By John Reid, M. D.

Since writing the few remarks on phlebolites which appeared in the last Number of this Journal, I found, during the last summer, several of these bodies in the vesical and uterine veins, which presented some unusual appearances. The largest was at least of the size of a garden-pea; the others were considerably smaller. The largest and several of the smaller consisted of two distinct portions. The smaller portion occupied one of the extremities, was smooth externally, of a bluish colour, and was nearly of the consistence of cartilage; the larger portion was of a bony hardness throughout. When dried, this smaller portion shrunk considerably, and resembled in appearance a piece of dried cartilage.

I find, upon more extensive inquiry, as I had previously expected, that many of those much engaged in dissection have observed these bodies more than once. I have found them in five out of the last sixty subjects in the dissection of which I have been concerned. My friend, Mr Fergusson, informs me that he once found them in great quantity in the mesenteric veins.

Tiedemann gives the following analysis of them by Gmelin :

Animal matter,	27.5
Phosphate of lime,	53.5
Carbonate of lime,	15.5
Magnesia and loss,	3.5
	100.0[*]

It is stated by Dr Lee that Dr Prout has also analysed them, and has obtained similar results.[†] Though the different changes through which these bodies pass in their formation have now been pretty accurately ascertained, yet the nature of the causes which produce these changes is exceedingly obscure. Tiedemann, Otto,[‡] Lobstein,[§] Cloquet, and Dr Carsewell,[‖] all agree that they are formed in the interior of the veins; that they at first consist of a coagulum of blood; in the interior of this clot the fibrin becomes pale and concrete, then assumes an osseous appearance, and this goes on little by little, and layer after layer towards the circumference. We could easily class their formation with the occasional deposition of calcareous matter among the other tissues, if Hodgson's opinion was correct, that they were first formed external to the veins, and afterwards made their way by absorption into the interior ; or if, according to Andral,[¶] they were in general first developed in the middle coat of the veins, and then passed into their interior in the same manner as the false cartilages are formed, and pass into the cavity of the joints. Hodgson stands alone in his opinion ; and we even find Mr Langstaff,[**] upon whose authority he describes these bodies, inclined to believe that they are formed in the interior of the veins. The adhesions of these bodies to the inner coat of the veins by a fine membrane, as observed by Tiedemann and Cruveilhier,[††] would afford some countenance to Andral's opinion, were it not at variance with accurate observation; and we may suppose that this appearance was produced by the presence of the foreign body causing irritation and effusion of coagulable lymph.

Tiedemann,[‡‡] and, following him, Lobstein, suppose them to be formed by a mechanical deposition of the calcareous matter contained in the blood, intermixing itself with the albumen of the blood. It appears to me that this opinion is unable to explain the manner of their formation in many cases, and consequently, can scarcely be regarded as the probable cause of their formation in those cases which seem to agree with this supposition. Mechanical deposition of the matters contained in the blood cannot, I think, explain their formation in those* cases, where we find an osseous-looking deposit taking place in the centre of a coagulum, around which the fibrin arranges itself in concentric laminæ, increasing in density as we proceed to the centre, and where apparently those nearest the centre gradually assume this osseous appearance, which extends itself towards the circumference.

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[*] Tiedemann's Zeitschrift fur Physiologie, Vierter Band Erstes Heft, 1831.

[†] Cyclopædia of Practical Medicine, article Veins.

[‡] Otto's Pathological Anatomy, translated by South.

[§] Lobstein's Anatomie Pathologique.

[‖] Cyclopædia of Practical Medicine, article Veins.

[¶] Andral's Anatomie Pathologique, Vol. ii. p. 412.

[**] London Medico-Chirurgical Transactions, Vol. viii.

[††] Cruveilhier's Anatomie Pathologique, Vol. ii. p. 71.

[‡‡] Journal Complementaire du Diction. des Sciences Medic. Vol. iii.

If these bodies resulted from mechanical deposition, could the earthy salts pass through the several dense laminæ of fibrin, and deposit themselves, apparently in certain proportions, in the innermost laminæ? If the presence of the earthy salts was the result of a deposition, would they not rather be found upon the outer surface of the most external lamina, instead of penetrating through it to reach the innermost? We cannot, at least in the present state of our knowledge on the subject, refer their formation to any chemical agency. Their formation is probably akin to the occasional hardening of tubercles into bony concretions, which is a process independent of any vascular organization of the tubercles themselves. It is also illustrated by the formation of the vegetations on the valves of the heart, as observed by Laennec and Dr Alison,—also to the tubercular, purulent, or encephaloid deposits, sometimes found in the fibrinous clots within the heart and great vessels.

I can scarcely venture to hazard an opinion on this subject; but I must confess that I feel inclined to believe (however fanciful the opinion may appear to some physiologists) that the great resemblance of those bodies in their chemical analysis to the osseous texture, the manner of their formation, and their possessing in some cases physical properties similar to cartilage, can only be explained by supposing that they are the result of a process resembling the formation of the osseous tissue in the other parts of the body.

It is possible, that when our knowledge of the spontaneous motions observed in the circulating fluids of vegetables and animals becomes more extended, we may be furnished with a more satisfactory explanation of their origin.

Tiedemann and Lobstein are of opinion that these bodies are more frequently found in arthritic patients; and they believe that this may be accounted for, by supposing that the blood in those individuals may contain a greater quantity of earthy salts. The concretions, however, found in the joints of arthritic patients consist of urate of soda, a salt not discovered in the phlebolites.

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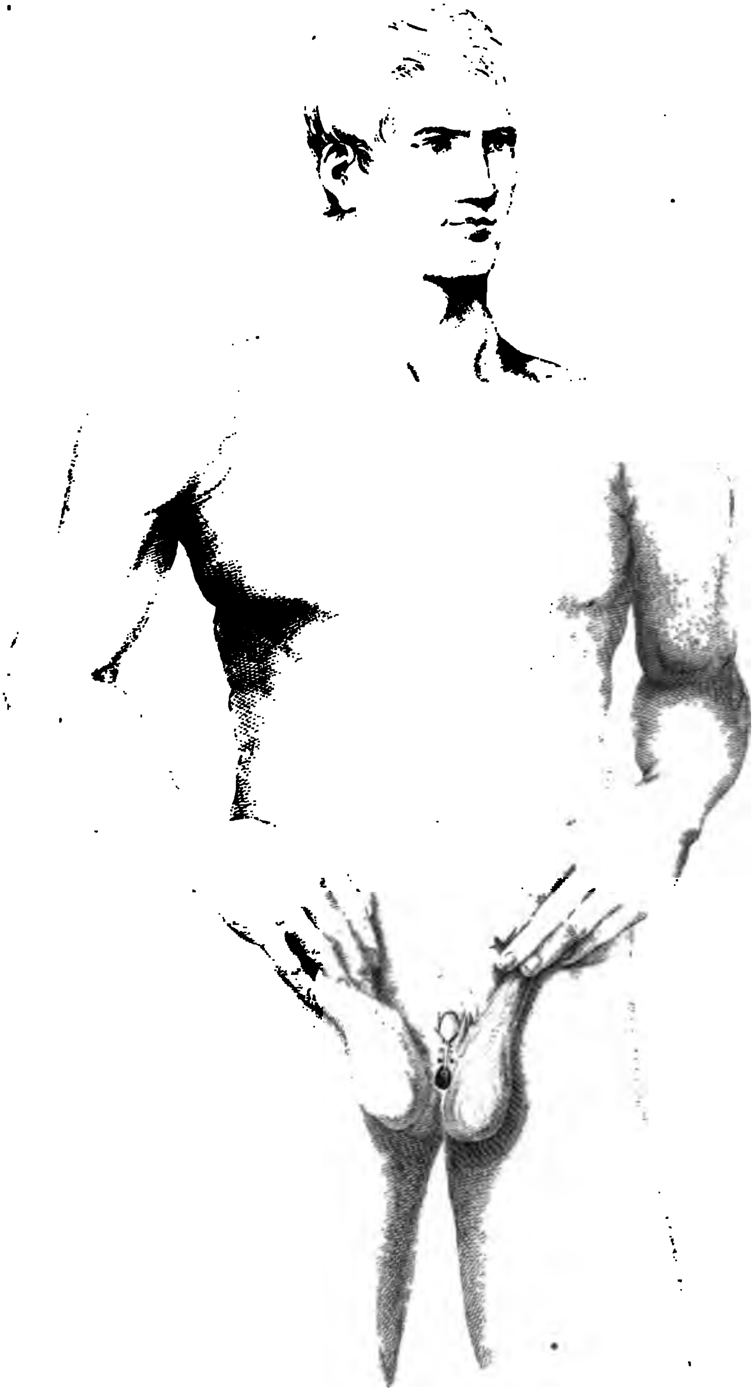
* Cloquet's Pathologie Chirurgicale, and Observations of Dr Carswell in article *Veins, Cyclopædia of Practical Medicine.*

Edin^r Med.& Surg. Journ. Dr HANDYSIDE'S CASE. Plate I, p. 313, Vol. XLIII.



In all the subjects in which I found them, there was no reason to suspect any arthritic affection; but having had very few opportunities of dissecting subjects who have suffered from gout, I cannot speak of their relative frequency. They are generally described as being deposited in the dilated veins; but we so often see the dilatations corresponding to the varied sizes of these bodies, that it appears probable that they are very frequently the consequence of their presence.

Since the preceding observations were written, I have found several phlebolites, in the spermatic or rather ovarian veins of the two last female subjects I have dissected. In one of these subjects, we found them in all the different stages of their formation.

Art. II.—*Account of a Case of Hermaphrodism.* By P. D. Handyside, M. D. Fellow of the Royal College of Surgeons, Lecturer on Anatomy in Edinburgh, &c. (Read before the Medico-Chirurg. Society, Dec. 3, 1834.)

Gottlieb Göttlich, the son of an officer in the Saxon service, was born at the village of Nieder Leuba, near Zittau, in the kingdom of Saxony, on the 6th of March 1798.

He was considered at birth to be of the *female* sex, and was accordingly baptized by the name of *Marie Rosine Göttlich;* the initial letters of which name, with the figures 1818, are stained on his right arm. He had a brother and two sisters, who died before he was born, and of whose appearance he can give no account. He was brought up and entered into service as a female, without his true sex being ever suspected, even by himself, till the spring of 1831, when, on account of a fracture of the left *os femoris*, he was received into the hospital at Dresden.

At this period, the part which had hitherto been regarded as the left *labium externum* became distended by a small round tumour, which proved to be the left testicle, that had descended from the *abdomen*, following the course of an inguinal hernia, which had been produced by a strain at work a short time before. The intestine becoming strangulated, Professor Bach operated for its relief.

A year after this the right testicle descended after a precisely similar manner, and on this occasion Göttlich being at Göttingen, the strangulation was relieved by an operation performed by Professor Langenbeck. The cicatrices are still visible on each groin, marking the seat of these two operations.* To obviate the inconvenience of hernias, which succeeded these operations, a double truss has since been worn.

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* I beg to refer to the annexed sketch of Göttlich, and also to a cast in the Museum of the Royal College of Surgeons of the greater part of his body, which I took the opportunity of making during his late stay in Edinburgh.

The parts hitherto regarded as the *labia externa* were thus shown to be the lateral halves of the *scrotum* separated by a fissure on the median line.

He still continued to clothe himself in female attire, and to wear his hair turned up, till November 1832, when he visited the University of Heidelberg; and then it was that I had first the opportunity of seeing him. Professor Tiedemann, before whom he presented himself, did not hesitate to regard him at once as a *male*, but declared him to be (in the words of that distinguished anatomist) "evidently a man, with genitals of uncommon conformation. She will dress herself, therefore, in men's clothes, and adopt the name of Gottlieb." Professor Blumenbach of Gottingen, to whom this individual was presented on the 4th February 1833, confirmed the view of Professor Tiedemann.

Since that period Göttlich has been employed exhibiting himself to the members of the medical profession at the different schools in various countries in Europe. After visiting Bonn, Jena, Marburg, Mainz, Offenbach, Breslau, Bremen, and other places on the continent, he travelled by way of Hamburg and Christiania to London in April last, where he was examined by Sir A. Cooper, Mr Green, Dr Davis, and Dr Grant. He next exhibited himself at Manchester, Liverpool, Cork, Dublin, Glasgow, Aberdeen, and Montrose, and arrived at Edinburgh in November last. Since coming here, he has attracted so much of the attention of the profession, that I have been induced to believe that a short notice of the facts connected with his case might not prove unacceptable if placed upon record.

The *general appearance and conformation of body* of Gottlieb Göttlich are essentially and distinctly masculine; although when attired in female clothing he bears a remarkable similarity both in form and temperament to the robust females of the lower class in the Department of the Upper Rhine. There is, however, a perfect masculine gravity of countenance, and a complete manly self-possession in his deportment at those times when he is exhibited in a state of nudity to a number of persons. His features are rather void of expression; he is not very intelligent; in his appetites and desires he is thoroughly sensual; and his discourse and occupations (perhaps from the influence of female habits and society) are altogether womanish. This bias and turn of mind may also proceed from the constitution being so long deprived of that influence which it naturally receives from the developement which the *testes* undergo at puberty; from the long-deferred appearance of which in this individual, his system has failed to be impressed with the true characters of his sex.

The *configuration of the head* also is male, though perhaps there is (apart from a national peculiarity in the form of the skull) a greater deficiency of *cerebellum* than is usual in the male compared with the female, the posterior part of the head being very flat. His sexual desires, however, are far from being below mediocrity. The head is exceedingly prominent in front, but a remarkable and very unusual depression is observable in each temporal region.

In respect to the *surface of the body* generally, there is not that abundant deposition of fat by which muscular action is in the female so much obscured, neither is there that spare developement of the muscles themselves, nor that want of character in the bones which characterize the female, and announce the delicacy of her frame-work, by its softer and smoother contour; but in the case before us, the structure of the whole cutaneous and adipose tissues, the well-marked roughnesses along the bones affording firm attachments to the strongly developed and very powerful muscles, whose action is marked in the diversified lines along the surface of the body, impart to the figure of this individual the hard and uneven outline which so generally characterizes the male structure.

Besides the matter and form of the surface of the body, its *proportions* also partake more of the masculine character. The height of Göttlich is five feet seven inches. The shoulders are somewhat projecting. The breadth of the chest measured between the two *acromion* processes is seventeen inches; that of the *pelvis*, between the two anterior superior iliac spines eleven inches,—denoting, therefore, the comparative narrowness of the *pelvis*, and its agreement with that of the male. In this person, as may be observed of the male sex generally, the distance between the *pubes* and the *umbilicus* is shorter than between the *umbilicus* and the *scrobiculus cordis*, while the reverse is found to be the case among females; and the chest is longer in proportion to the other parts than in the female sex. The neck is short and thick; its length, from the chin to the *jugulum*, is only three inches: the length of the *sterno-mastoid* muscle only six inches, while the breadth of the neck (in accommodation with the male proportions elsewhere observed) is four and a-half inches. The *pomum Adami* is largely developed; and the voice, which before the testicles appeared was soft and quite feminine, began at that period to undergo the change of *moulting*, and it has now assumed a somewhat graver and more masculine tone.

The breasts also, which in early life were slightly elevated, have become, since the descent of the *testes*, much smaller and perfectly flat. The *perinæum* is masculine. The knees also present more of the male character, and the circumstance that, when Göttlich stands erect, they approach more closely together than is usual in the male sex, is attributable to the mode of treatment adopted after the fracture of the *femur* already adverted to.

The next general feature in this person respects the *hair* on the surface of his body. Not only has that on the head become thicker and stronger since the testicles came down, but an appearance of hair on those parts of the body where at puberty in the male it grows has lately presented itself. A light downy beard has appeared on the chin and upper lip, and the hair in the *axillæ* and about the *pudenda* has increased materially. There is a little below the knees, but the legs, thighs, *raphé* of the *perinæum*, arms, and chest, are destitute of this covering.

Lastly, the *genito-urinary organs*, though in their external features imperfectly developed, yet present a conformation essentially masculine. The *pubes* is not prominent, and there is no developement of the *mons veneris*. The *penis* is one inch and a half in length, but imperforate. The *glans* is distinct, and of a red colour ; it is more pointed than usual, appearing like an enlarged *clitoris*, to which it bears a more perfect resemblance from the absence of the *urethra* ; there is, however, a slight longitudinal depression where the *urethra* should have opened. The prepuce is one inch in length, loose and rugose, overhanging the *glans*, and attached to its lower surface, on each side of the depression for the *urethra*. The *crura penis* are large ; and, on an examination being made through the *rectum*, may be distinctly felt proceeding from the *tubera ischii*, and uniting together a little way in front of the arch of the *pubes*. When erected, the length of the *penis* is increased to two inches, and in thickness it resembles a common-sized fore-finger.

Below the *penis*, and occupying the place of the *septum scroti*, there is a narrow elevated line or *raphé* one inch and a-half in length, commencing at the *frænum præputii*, and terminating on the upper surface of a canal of about one inch in diameter and three inches in depth, leading to the urinary bladder. The opening into the bladder is through a narrow orifice at the farther end and on the upper surface of this capacious canal, and corresponds in direction, in length, and in width to the female *urethra*.

When the walls of this canal, simulating in some respects a *vagina*, are examined by the aid of the speculum, they are seen to be lined by a membrane presenting many folds resembling the *carunculæ myrtiformes* ; and upon a more minute and extended examination of this canal with the assistance of a sound in the bladder and the finger passed up the *rectum*, it seems to have no connexion whatever with a *uterus*, a *prostate*, or any other organ. No menstrual discharge, or any symptoms indicating the natural efforts to perform that function, have ever occurred. At the period when the *testes* descended, however, Göttlich experienced repeated attacks of *hæmoptysis.*

The urinary passage is separated from the *perinæum* by a semilunar fold of skin (resembling the *furca virginis*) which serves to direct forward the stream of urine; and its inferior border is at the distance of two inches from the *anus*, but connected to it by means of the usual cutaneous elevation,—the *raphé perinæi.*

The testicles, which are about the common size, though rather softer than natural, are, with their vessels, unequivocally present. They are pendulous in the halves of the *scrotum*, and placed at an inch distance on either side of the *raphé*, already alluded to as occupying the situation of the *septum scroti.*

From the *meatus urinarius* to the *glans penis*, the membrane on each side of the *raphé* appears in some particulars to resemble the portion of the natural *urethra* anterior to the *bulb.* It is thin and delicate, and highly vascular; and there are observable on its surface, near the *glans*, three minute *lacunæ*, probably the orifices of Cowper's glands, from which a mucous discharge is poured out; as well as two larger valvular openings (capable of admitting fine bristles to the depth of an inch,) which are the terminations of the *vasa deferentia*, and are placed immediately below the former apertures, and at the distance of about four or five lines on each side of the elevated line, which corresponds to the *raphé* and *caput gallinaginis* of the *urethra.*

The seminal fluid which, in the act of coition, or in nocturnal emissions, is discharged from the openings of the *vasa deferentia*, has been submitted to the microscope, and found to present the usual characters.

In the last place, with regard to the *sexual desires* manifested by this individual, these are moderately strong. He has had frequently connexion with the male, from the age of fifteen years to the present period, and, indeed, up to the time when the testicles descended, he felt no inclination for connexion with the female. He has, however, since that period experienced this desire, and gratified it while at Hamburgh two years ago. The circumstance, that he cannot perfectly perform the functions of a man, may serve to explain how he has not much passion for women, and how his amative desires are still directed towards his own sex.

In addition to the detail of facts to which in this communication I have confined myself, I would observe, that the peculiarities of developement now described appear to me to consist almost entirely of *deficiencies of male organisation.* Though I have, in compliance with the common language of authors, entitled the case one of Hermaphrodism, as this term has been commonly applied to instances of animals being brought forth whose organs of generation are preternaturally formed,—yet, in strict physiological propriety, this is a term which ought, I believe, to be confined to that species of malformation of the organs of generation, in which there is really a mixture of male and female parts in equal or in different degrees.

Under the impression, then, that such is the just and correct anatomico-physiological definition of an hermaphrodite, and that there is much reason to believe that no strict instance of such a condition of the generative organs,—a union of all the organs of both sexes in the same individual,—has ever occurred either in the more perfect animals, or in the human species, I would designate the foregoing case of Göttlich as one simply of *Hypospadias*, (or *urethra* forming but half a canal, and opening below the *penis*, or in the *perinæum*,) which is only the first step towards true and real hermaphrodism.

But a feature in which I believe *this* case of *hypospadias*, though in many particulars resembling others on record, to be perhaps unique, is in the manner in which the *urethra* opens on the upper surface of a wide canal; therein appearing to be strictly analogous to the mode of entrance of the membranous portion of the *urethra* into the *bulb*.

In conclusion, though such malformations of the parts of generation in the male, which have been mistaken for a mixture of those of both sexes, are in a great number of cases beyond the reach of surgical art, it is otherwise in the present instance, where there exists a very minor degree of imperfection in the impregnating organs; it being ascribable only to a deficiency in the *urethra*, and apparently to no other cause that Göttlich has proved himself to be incompetent to discharge the functions of his sex. Accordingly, the imperfection in the *urethra* might be materially diminished, if not altogether removed, by contracting the orifice of the wide canal in the *perinæum*, and by uniting the edges of the divided *scrotum;* thus continuing upwards the canal of the *urethra* to the *glans penis* itself. The present case is one in which we might fairly anticipate success from such an operation. When it was formerly proposed, however, by Professor Langenbeck, Göttlich declined all surgical aid, and he is now still more averse to a proposal of this kind, since it would at once deprive him of his present easy and profitable mode of subsistence.

March 1835.

Edinr. Med. & Surg. Journ. Dr. BALFOUR'S CASE. Plate II, p. 319, Vol. XLIII.

Fig. 1.

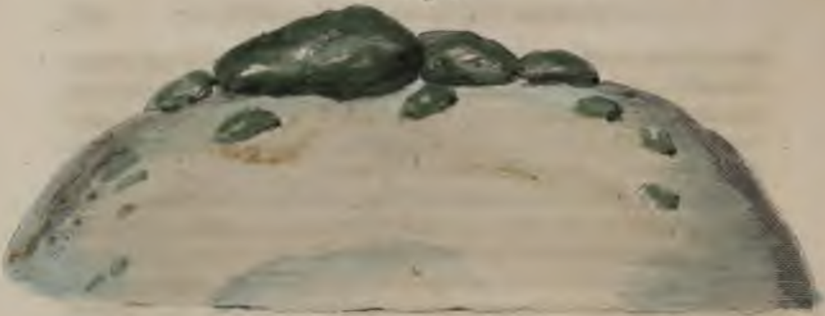
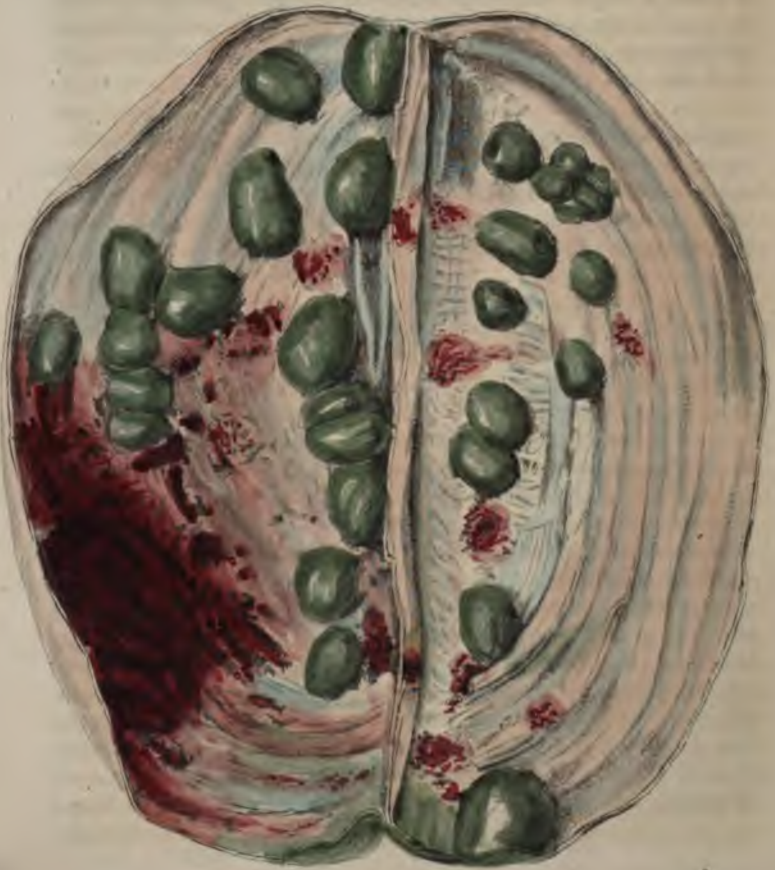


Fig. 2.



G. Aikman, Sculpt.

Art. III.—*Case of peculiar Disease of the Skull and Dura Mater.* By J. H. Balfour, M. D., F. R. S. E., Fellow of the Royal College of Surgeons, Edinburgh. (Read to the Medico-Chirurgical Society on the 3d December 1834.)

On the evening of the 4th October 1834, I was requested to visit a young gentleman, about 18 years of age, who, according to the statement of his friends, laboured under deafness of several months duration, which they had considered to be his chief complaint, but which was soon proved to be merely a symptom connected with some deep-seated disease of the head.

The patient was tall and emaciated, his eyes were large, his countenance had a pallid hue, and he appeared to be of a strumous habit. On inquiry, I found that he complained of headach, which was at times severe, and was accompanied with vertigo, and a sense of ringing in the ears and throbbing in the head. The pain frequently extended through the whole head, but was generally referred to the posterior region. The *cranium* itself was large and well-developed, but did not at that time present any peculiar appearance which would have directed attention to it. He experienced a feeling of weight and heaviness in the head, which was somewhat relieved by assuming a recumbent posture. There was some discharge from the right ear, and an appearance of ulceration in it. His pulse was 120, with a peculiar jerk, and his tongue was very foul and coated. There was considerable heat of surface, more especially in the head. His appetite was tolerably good, and he complained much of thirst. His bowels were confined, and were reported to be generally constipated,—no evacuation taking place often for eight days at a time. He had also some shooting pains in the knee, hip and shoulder joints, which he attributed to rheumatism. Though he was in the constant habit of going out for the purpose of taking a walk, still he was easily fatigued by any exertion, and was obviously in a weak state of body.

His friends stated that he had always been of a pensive disposition, and, even when a child, had not entered into the active sports of other boys. He was very fond of reading, and his headach was principally attributed to this. His growth had been very rapid within the last two years, and he was much taller than most young men of the same age. He had always displayed great cleverness and proficiency in his studies, and although, from particular circumstances, he laboured under great disadvantages as to the means of education, still, by his own unaided exertions, he had made considerable progress in ancient and modern languages, as well as in mathematics. He had never been very robust, and had not enjoyed good health for several years, but his intellectual powers had always been vigorous and active. About three years previously he had been affected with pulmonary complaints, which were relieved by bleeding and the antiphlogistic regimen. Subsequently to this he complained of pain in his head, which had continued to recur at intervals ever since, but which had never assumed any degree of severity till within the last few weeks. With the view of easing the pain and procuring sleep, he had frequently of late resorted to the use of laudanum in considerable doses. His deafness had commenced in the month of August last, after exposure to cold and wet, and had continued to increase since that period. No medical treatment had been adopted, from an impression on the part of his friends, that his complaints were owing to a want of tone and energy about the system, and would ultimately be relieved by proper attention to diet and regimen.

From the state of the bowels and tongue, I was induced, in the first instance, to prescribe a full dose of purgative medicine. Cold was also applied to his head; his ears were syringed with milk and water; and an embrocation was rubbed on the knee, hip, and shoulder. He was put upon light diet, and was ordered to abstain from reading, and any violent exercise. The use of laudanum was also as much as possible prohibited.

Next day the symptoms were unabated, and, as the medicine had not produced any effect, pills, consisting each of five grains of the colocynth pill mass, and one drop of croton oil, were administered. The exhibition of four of these produced, on the 6th of October, a copious evacuation of indurated feces. Still, however, the symptoms were little relieved, and the headach continued to recur in paroxysms, which were particularly severe during the night, and forced him to have recourse to laudanum for the purpose of procuring sleep. The severity of the pain of the head was frequently indicated by a peculiar distressing expression of countenance, a contraction of the muscles of the forehead, and an involuntary sort of sighing. During the occurrence of the pain he seemed to be uneasy in every position, and attempted to obtain temporary relief at one time by walking about the room, and at another by assuming a recumbent or sitting posture. When walking, the feeling of weight in the head annoyed him much. The deafness was still very great; pulse very frequent; and tongue foul. Leeches were now applied to the head, and the bleeding was encouraged for several hours, and afterwards cold applications were continued. He was ordered to have a warm bath, and the purgative pills were repeated. The ears had been syringed several times with soap and water; but, as the deafness seemed to depend on some deep-seated disease, this operation was now omitted. The leeching was followed by scarcely any alleviation of the symptoms, and the following is the report of the 10th of October:—Headach severe, recurring in paroxysms, rendering him very restless and uneasy, and frequently causing him to sigh; great sense of weight in the back part of the head; pulse 130; tongue cleaner than formerly, but still white and furred; skin warm; discharge from the ear continues; some numbness in the *perinæum* and about the *anus*, with difficulty of micturition; eyes rather prominent, and some effusion of blood under the *conjunctivæ*, which appear swollen.

His head was now shaved, and a blister was applied to the back part of the head and the nape of the neck; the discharge from which was kept up by savine ointment for six or seven days. An astringent lotion was applied to the eyes; and whey, ether, and tincture of muriate of iron were given to relieve the dysuria. A purgative enema was also administered, and ordered to be repeated every two days, if the bowels were not freely relieved.

As the headach, however, still continued to recur with severity, I now, with the approbation of Sir George Ballingall, who saw the case, ordered two grains of calomel, and half a grain of opium, to be taken twice a day. This treatment was continued for seven days, until the mouth became slightly affected. Saline medicine was then administered, and, as the throat had assumed an aphthous and œdematous appearance, a stimulating gargle was prescribed. The throat was also scarified, in order to afford relief from the feeling of suffocation which the patient experienced.

The mercurial action continued for several days, and was succeeded by a complete remission of the headach.

The eyes, however, at this time became very prominent. There was considerable bloody effusion of the *conjunctivæ*, and an œdematous swelling and protrusion of the mucous lining of the eyelids. There was also slight strabismus, and some degree of double vision.

On the 1st of November, the following is the report of his state:—Headach has not returned; eyes very prominent; conjunctival lining much swelled and protruded; vision very imperfect; bowels now easily kept open by a dose of compound powder of jalap and enemata; tongue rather white; pulse varying from 120 to 130, irregular; discharge from blister has ceased. Has occasional nervous tremors, during which the head and body are much agitated, while the senses remain entire, and he is able to answer questions distinctly.

On the morning of the 2d November, he experienced a feeling of numbness, which extended along the whole of the left side of the body, and was accompanied with sickness, vomiting, pain at the *scrobiculus cordis*, and some difficulty of breathing. These symptoms were relieved by the use of stimulating embrocations, and the administration of a little brandy.

On examining the head at this time particularly, I remarked a peculiar prominence over the upper part of the frontal and parietal bones, communicating an elastic sensation as if the sutures were cartilaginous. Pressure on the swelling caused slight pain. On examining the patient carefully on the evening of the 2d along with Dr Abercrombie, we detected a hard tumour behind each eye immediately under the superciliary ridge, pressure on which did not cause much pain.

The head was ordered to be again shaved, and a blister was applied over the whole head. At the same time, the purgative medicine and the other remedies were continued.

Previous to this period the patient had been able to sit up during the greater part of the day, but now, in consequence of the tremors, &c. he was confined wholly to bed, and continued to be so until his death. November 3d. Blister on the head rose well; swelling of eyes continues; bowels open; pulse as before; tongue cleaner; some cramping pain of stomach, which was relieved by magnesia and antispasmodic draughts. In the course of three or four days, the eyes became so prominent that the eyelids could scarcely cover them. On the 8th of November, the vision of the right eye was totally lost, and the eye itself, from constant exposure, became opaque and collapsed. In the course of two or three days more, the left eye also was so much protruded as to be totally unfit for vision, and it too lost its transparency and figure. The mucous membrane was also protruded so as to appear like a prominent circle round the eyes.

While the protrusion of the eyes was going on, the tumours on the head had increased much in size, and smaller swellings of a similar nature appeared on different parts of the *cranium*. Some abscesses likewise appeared on the neck, and one of the tumours on the back of the head began to discharge a greenish-coloured matter. Above the *zygoma* on the right side a distinct swelling was also detected.

Leeches were applied to the tumours in the orbits, and blisters were applied to the temples, which were dressed with mercurial and hydriodate of potass ointment. Cold astringent lotions were prescribed for the eyes, and the eyelids were rubbed with hydriodate of potass ointment.

All the symptoms, nevertheless, became aggravated; his eyes were more and more protruded, so as to be almost forced out of their sockets, the tumours on the head increased both in number and size, and the nervous tremors became distressing. He was disturbed by fearful dreams, and frequently awoke in great agitation. When roused he answered questions distinctly, and seemed to be quite coherent. He occasionally asked for food, which he seemed to take with some degree of relish. He always intimated to the nurse when he wished to go to stool or make water, and was uniformly assisted out of bed on these occasions. This he continued to do till within a day of his death.

From the middle of November, the medical treatment consisted in keeping the bowels open by medicine and enemata; giving anodyne and antispasmodic draughts when the nervous agitation and cramping pain of the stomach were severe; applying cold astringent lotions to the eyes; and administering nourishing diet.

On the 22d and 23d of November, he was in a very restless and agitated state, being frequently troubled with horrible dreams, and throwing off the bed-clothes, as if in great agony. The recollection of some family distresses seemed to prey upon his mind, and he frequently alluded to them in a very striking manner. At times he fell into a low quiet state, during which his pulse became small, feeble, and irregular, and his extremities cold. From this state he was several times roused by stimuli.

Although he was now much weaker than formerly, still he could raise himself in bed, and seemed to possess considerable muscular power. He could still answer questions rationally, but his articulation was less distinct, and his deafness extreme. The paleness of his complexion, and the prominence of his eyes, combined as they were with blindness and deafness, contributed to give his countenance a peculiar ghastly and cadaverous appearance.

24th. Appears to be sinking; pulse varying from 130 to 140, small and weak, and at times nearly imperceptible; skin becoming cold; some wheezing in the respiration, which is quicker than natural; answers questions very indistinctly, and can scarcely be made to hear; bowels opened by injection; no paralytic symptoms, and less nervous agitation. Wine and brandy were ordered to be given, and warmth was applied to the extremities. At seven A. M. on the 25th of Nov. his breathing was very laborious, and was accompanied with much mucous rattle. He had been restless during the night, frequently throwing off the bed-clothes, and raising his hands to his head. He was now, however, quiet, and seemed to be insensible; pulse nearly imperceptible. From this time he gradually sunk, and expired without a struggle at half-past nine in the morning.

26th. Nov. *Inspection 28 hours after death.* On removing the scalp, there was observed a large mass of olive-green coloured matter, in some places half an inch in thickness, and about an inch and a half broad, covering the sagittal suture and part of the parietal bones on either side, and extending from the coronal nearly as far as the upper part of the lambdoidal suture. (See Plate II. Fig. 1.) This green-coloured matter was of a firm cartilaginous consistence, and presented a smooth green surface, when cut with the knife. It was intimately connected with the outer table of the skull. Patches of a similar kind of matter existed on several parts of the parietal and occipital bones, and a large mass was detected below the right temporal muscle, attached to the bone on that side.

On removing the skull-cap, its internal surface, more especially at the upper part above the longitudinal sinus, was observed lined here and there with thin layers of a similar green-coloured matter, interspersed with some bloody spots, and the bone in these situations was distinctly roughened by absorption, and exhibited a cellular cancellated appearance. In three or four places the skull-cap was so thin as to be quite transparent.

On the upper surface of the *dura mater* there was a large deposit of the green-coloured matter, and several rounded masses were scattered over it in different places. The internal surface of the *dura mater* was studded with rounded green-coloured masses covered by the inner layer of that membrane. At the back part of the inner surface of the *dura mater*, on the right side, there was a large bloody patch with several smaller bloody spots around it. (See Plate II. Fig. 2.)

Green-coloured masses were also found outside the *dura mater*, close to the petrous portion of the temporal bone, on the sphenoid bone, and in other parts of the base of the skull, as well as at the union of the *falx* and *tentorium cerebelli*, and under the *cerebellum*.

Near the *crista galli* of the ethmoid, the orbital plate of the frontal bone, on removing the *dura mater*, was seen to be thin, transparent, and so soft as to be easily perforated,

There was some effusion under the arachnoid, and a minute quantity of serosity in the ventricles. The brain was very firm in texture, but did not exhibit any trace of disease in its substance.

Almost the whole of the cavity of both orbits was filled with green-coloured firm matter, similar to that found on the *cranium*. The matter was firmly attached to the frontal bone, and had no connexion with the interior of the *cranium*. The optic nerves, while in the interior of the *cranium*, were healthy, but in passing through the green matter in the orbit, they became small and elongated.

No examination was made of the chest or *abdomen*.

Since writing the above, I have learned that several members of the family have died of *phthisis*, and some have been cut off by head complaints.

The disease in this case appears to be of a very uncommon nature, and is not noticed, so far as I know, in the works of any authors who have written on diseases of the head. I have, therefore, been induced to draw up a full account of its symptoms and history, so far as they could be ascertained. I fear, however, that, while I thus add an interesting fact to our pathological knowledge, I am unable to suggest any remedy for the disease.

From the morbid appearances presented on dissection, I think we are entitled to draw the conclusion, that the disease had existed for a considerable period; and its commencement may in all probability be dated so far back as the time when the patient first complained of headach. This, it will be observed, was between two and three years before his death. The morbid changes, however, appear to have proceeded at first in a very slow and insidious manner, and no distinct signs of their existence were obvious till August 1834, when, after exposure to cold, deafness came on, accompanied with an aggravation of the headach. From that time the progress of the disease was more rapid, and was marked by more evident symptoms.

The tumours on the skull and *dura mater* were peculiar both as regarded their texture and colour. In texture, they resembled what has been termed a soft node, and when cut into, they presented a uniform smooth surface, similar to that of blancmange, rendered very stiff by the addition of isinglass. Their colour, as represented on the plate, was of a bright olive green,—a tint which may have been owing to the presence of colouring matter of a similar nature to that found in the bile. This is a mere hypothesis, as, unfortunately, no chemical analysis was made of it. I may remark, however, that the patient never laboured under jaundice, and was not subject to any bilious complaint. I regret that no examination was made of the chest and *abdomen*, to ascertain whether any tumours of a similar nature existed in the lungs, liver, heart, or large vessels.

It is particularly deserving of notice, that the intellectual powers continued nearly unimpaired during the whole course of this formidable disease. It will also be remarked, that the severe headach yielded speedily and completely to the use of calomel and opium; while the tumours on the head and in the orbit increased latterly with amazing rapidity, notwithstanding all attempts to check their progress. No particular cause can be assigned for this remarkable disease, although it undoubtedly may in some degree be connected with the patient's strumous *diathesis*.

15, *Dundas Street*, 7*th Feb.* 1835.

Art. IV.—*Observations, Pathological and Therapeutic.* By John Scott, M. D. Fellow of the Royal College of Surgeons.

I. *On some varieties of Intermittent Headach.*—Intermittent headach is sometimes a very distressing, and occasionally an obstinate affection. Several interesting cases having lately come under my observation, I have been induced to draw up a few notes of their history.

The most common form is that in which pain is felt over one, or more rarely, over both eyes, coming on at a certain time of day, gradually increasing in severity, continuing three or four hours, and then decreasing,—the patient being entirely free from pain in the intervals. This is sometimes confounded with *tic douloureux;* but from this it differs in several respects. There is little or no constitutional disturbance present, though we usually find that the tongue has been foul, and that there are symptoms of derangement of the digestive functions, which are generally removed by laxative medicines, Dover's powders, and mild diaphoretics, followed by quinine. The most effectual remedy is, however, an emetic, and I have known it succeed when all other means have been used in vain.

It is the more severe forms connected with, or probably proceeding from, inflammation of the membrane of the nose and frontal sinus that I wish to describe. It begins with a feeling of fulness and stuffing in the nose, with severe pain at its root, gradually increasing in violence, and attended with great intolerance of light, sometimes delirium and stupor. The following case, will however, best describe the affection to which I allude.

A gentleman, 34 years of age, of robust habit and rheumatic constitution, though at this period he had not suffered from that disease, had been complaining for a week of pain in the head, which became gradually worse. The paroxysm may be thus described. At nine in the morning the temperature of the skin was natural; the pulse 66; the countenance clear; and the patient had no pain. In half an hour he complained of pain at the root of the nose, extending to both sides of the forehead. In two hours the pain had become very severe, with hot dry skin; the pulse at 78; the eyes red, light painful. At two the pain was intense over the whole forehead, he screamed aloud with agony if the least ray of light was admitted to the room; the skin was very hot; the countenance dark-coloured; the pulse was full and strong; and the carotid arteries beating violently. In an hour, when stupor and a degree of insensibility ensued, he allowed that the pain was not so severe as formerly. About four a slight moisture broke on the skin, which increased to a profuse perspiration, and continued for three hours, with relief of all the symptoms. In the evening he felt quite well, and had a good night; but with the returning day the disease recurred.

I bled him freely from the arm at the commencement of one of the paroxyms, applied leeches, and prescribed purgatives, calomel, colchicum, and James's powder, but with no decided advantage. We then gave him large doses of sulphate of quinine at intervals during the night, with the effect in a few days of postponing the hour of attack, and alleviating its severity. To this treatment it eventually yielded, though the whole course was more than three weeks.

About four years afterwards, the same gentleman was threatened with an attack of a similar kind. The pain, which had been moderate for some days, became extremely severe, and assumed the same periodical form. Having frequently found great benefit from the application of leeches to the internal membranes, I applied in the morning three to each nostril. They bled profusely, and this was encouraged by inhaling steam. The spirit vapour-bath was now used for half an hour with decided good effect. It produced free perspiration and relief from pain. By these means the violence of the disease was broken, and it was readily removed by laxatives and *colchicum.*

This affection partakes strongly of the nature of rheumatism. I have sometimes found it alternating with rheumatic pains in other parts of the body, leaving the forehead, and appearing violently in the arm. It is more frequently, however, confined to the nostrils and frontal sinus.

Since the occurrence of this case I have been frequently in the habit of applying leeches to the nostrils, and always with relief. They fasten readily, fill themselves in a short time, and produce a copious flow of blood,—two or three being much more effectual than a dozen externally. Might not this practice be of service in inflammation of the brain in children?

It is sometimes difficult to distinguish cases of this kind from inflammation of the substance of the brain, and they always require most attentive observation. We occasionally meet with cases in which disorganization of the brain is going on, when the pain is completely intermittent, when there is no intolerance of light, no affection of the mind—speech, deglutition, sensation, and muscular motion complete, till convulsions come on, and death follows. The following case was considered to be one of inflammation of the brain.

A middle-aged man received upon the right side of the parietal bone a blow which penetrated the scalp. The wound healed well; but in a few days he was seized with severe pain over the right side of the head, gradually extending over the whole, with intolerance of light. He was copiously bled with complete relief; but the pain returned. He was again bled with the same effect; and this had been repeated three or four times when I saw him.

On examination, it appeared that the disease was in the *periosteum*, and not in the brain. There were complete intermissions of eight or ten hours. The pain began at the cicatrix, gradually extending over the whole surface of the head, and became more severe, with excessive intolerance of light. When perspiration broke out either naturally or from sudorifics, he was entirely relieved; but the slightest check caused the return of the pain to so great a degree, and so sensible was he of this, that nothing would induce the patient to put even a finger from under the bed-clothes, and he lay for hours literally bathed in perspiration.

On this principle was the disease treated. On the first accession of pain antimonial powder was given freely. I found that ten grains every hour or hour and a-half speedily induced and kept up free perspiration; but a dose of twelve or fifteen brought on vomiting without relief of the symptoms. With this treatment during the paroxysm, and sulphate of quinine in the intervals, the patient recovered.

II. *On Mental Emotion as a cause and cure of Disease.*—It is not my intention to enter into the wide and interesting field of speculative inquiry, which forms the subject of the following cases; my object is to briefly detail three instances of disease produced apparently by mental excitement. It may sometimes be useful to describe cases which, though not of great importance in themselves, may lead to the communication of interesting and valuable information from experienced members of the profession.

1. *Instance in which a convulsive affection was produced apparently by panic.*—A boy, about 10 years of age, residing in the High Street, was brought home in a state of insensibility. I saw him a few minutes afterwards. The countenance, hands, and arms, were of a dusky hue; the skin cold; the pulse at the wrist scarcely perceptible; the heart acting very feebly; slight convulsive motion in the lower extremities at intervals. He was found lying in this state at the head of a close, insensible and vomiting.

A vein was opened in the arm, from which a few drops of very dark-coloured blood flowed. Heat was applied to the legs and body, and a mustard emetic poured down his throat. This soon excited free vomiting. The blood flowed from the arm in a fuller stream, and the patient showed signs of reanimation.

Slight convulsions continued, but in about two hours he was much recovered. When I saw him next day, he was nearly well, and complained only of his head, but he had several attacks of a similar kind, though less violent in degree, during the night.

Upon investigation, it was satisfactorily ascertained that a butcher's boy had run after him with a knife, threatening to kill him, when he dropped down in a state of insensibility. He had not been previously affected with fits of any kind. As the case occurred immediately before the appearance of cholera in Edinburgh, it excited considerable alarm, as the symptoms were thought by the bystanders to resemble those of that disease.

2. *Case of Fatal Inflammation of the Membranes of the Brain induced by panic.*—A fine intelligent girl, aged 8, became a dispensary patient on Saturday the 31st April 1827. I saw her about one P. M., and received the following history of her complaint. On Thursday evening, she received a fright, and was seized with violent shivering, and during the night complained much of pain in her head, which prevented her from sleeping. On Friday her sight and hearing were observed to be affected.

When I saw her, she was moaning occasionally, had several slight shiverings, and seemed to be insensible, as she did not answer when spoken to. The eyes were bright, the pupils moderately contracted, and sensible to light, though the eyelids did not shut on the approach of the finger; the features were natural; the pulse quick and irregular; she raised her hand to the head occasionally, as if to remove something that incommoded her. At short intervals she had a slight shivering or rapid muscular contraction of the whole body, accompanied by moaning; at other times she lay quiet. The jaws were firmly clenched; the heat of skin moderate; and the head warm, with great vascular action. No passage had taken place from the bowels since the attack came on.

I ordered calomel powders and turpentine injections every third hour. A few ounces of blood were taken from the arm, and twelve leeches were applied to the head.

Sunday. The features were collapsed; the *alae nasi* distended; general restlessness and shiverings, more approaching to slight convulsions; eyes dull; pupils not dilated; complete insensibility to light; pulse remarkably quick and weak; arterial action over the temples and forehead strong; bowels opened very freely by the medicines; a blister to the neck; cold applications to the shaven scalp, and the calomel and injections continued. She grew worse during the night; was seized with violent convulsions, and died at five on Monday morning.

About twenty-nine hours after death, I examined the head. The countenance was placid; the lower jaw firmly fixed; the pupils moderately contracted; and a little foam was observed at the corners of the mouth. The head was large; the superficial veins large; the skull uncommonly dry and bloodless.

The *dura mater* was natural externally; its internal surface very red on the anterior and superior part, exhibiting both the ramiform and punctuated redness. When removed, the appearance presented was very singular. It seemed at first as if the whole superior surface of the brain was covered with a layer of light yellow purulent matter; but this was found to arise from a firm deposition of coagulable lymph below the arachnoid membrane.

The arachnoid was extremely dry, presenting its usual bloodless appearance, the yellowish lymph shining through it; but though extending from the frontal protuberances to the *occiput*, it was not uniform, the membranes retaining their usual colour and appearance. The arachnoid, lymph, and *pia mater*, could easily be stripped from the brain, which in some small points was softened; in others, when the lymph was removed, was found covered with very numerous small red spots. The lymph was not merely spread over the surface of the brain, but entered between the convolutions, evidently proceeding from the *pia mater*, which was loaded with innumerable vessels.

The membranes of the basis of the brain, though redder than natural, were free from lymph, except round the optic nerve, where it was again visible. The *plexus choroides* was turgid with blood. The brain itself, with the exception of the softened parts already mentioned, was healthy. There was very little *serum* in the ventricles.

A considerable quantity of milky *serum* flowed from the spinal canal.

3. *Case in which symptoms of Chorea were excited by fear.* —Miss B., aged 13, a fair slender girl of nervous temperament, came home from school in a state of considerable agitation, which she attributed to a quarrel between two boys in the street, which had greatly terrified her. In the evening it was observed that the left arm had an involuntary motion, which increased so much in a few days that she could not hold anything steadily, or carry it to her head. The bowels were found to be loaded, and the alvine discharges dark-coloured and offensive. Laxatives were regularly and rather frequently administered. She was taken from school and ordered to be as much in the open air as possible. Opiate frictions were applied along the spine, and the body sponged with vinegar and water. The disease, however, continued to increase, and in ten days it was observed

that she dragged the leg in walking. The purgative plan was persevered in till the alvine secretions were improved. The head and neck were also affected. The countenance now looked clearer, and she felt better; but there was rather an increase than abatement of the affection.

Sulphate of quinine, and afterwards the oxide of zinc, was given. The latter medicine, however, after two or three doses, always produced a peculiar kind of sickness, by which she recognized it, however disguised. After a trial of several other remedies, four drops of the arsenical solution were given three times a-day.

She was then sent to the sea side, and used the cold bath. This, however, did not agree with her, as the convulsive motions were always increased after its employment. It was, therefore, omitted, and cold sponging substituted. In about three weeks she was nearly well, and the irregular motions in the leg had entirely ceased. They still continued in the hand, but in a slight degree. The arsenical solution appeared to produce no unpleasant effect. The appetite and strength increased under its use, and it was continued for some time after the disease had disappeared. The whole quantity given was two ounces. She left town in perfect health.

This case is interesting from some of the circumstances attending it. I was at the time visiting a younger sister, and observed that Miss B. was looking ill, pale, and emaciated. On inquiry, the bowels were found to be loaded, and the discharges dark-coloured. Having come to town for education, I found she was employed in classes from nine o'clock to three P. M., besides preparing in the evening for the lessons of the next day. I advised that two additional hours should be devoted to exercise, but before this had time to produce any effect, a cause which, under more favourable circumstances, would have passed unnoticed, produced in her deteriorated state of health an attack of *chorea.*

4. *Case in which the symptoms of Epilepsy were prevented from recurring by apprehension.*—The cases in which Boerhaave prevented the attack of imitative epilepsy by the threat of the hot iron are well known. A similar result followed in the ensuing case.

J. S., 8 years of age, was brought from Glasgow for medical advice. He had been affected for nearly a year with fits, which were considered as epileptic. They had at first occurred at considerable intervals, but for some time past were very frequent, sometimes three or four in a day. The head was large; the veins of the temples and forehead particularly distended. He was considerably emaciated; the abdomen tumid; the skin rough, dry, and scaly; appetite irregular. Several medical men had been consulted; but, from the persistence of the affection, it had been considered as depending on a diseased state of the brain. A full detail was furnished by his medical attendant, from which it appeared that various means had been used, more particularly nitrate of silver. On the journey to Edinburgh he had three or four severe attacks, which, from description, had the epileptic character. I saw him in the evening, and ordered some laxative medicine, and met Dr Abercrombie in consultation next morning. On finding the evacuations lumpy, fetid, and clay-coloured, we determined to try the effect of turpentine, which was given in half-drachm doses three times a-day. This acted freely on the bowels; and during the three weeks he was under our care, he had no fit, and his health and strength improved. I accompanied the family part of the way on their return to Glasgow, and an accident occurred, which his parents assured me would at a former period have infallibly produced an attack, but it passed over with merely a fit of crying.

Shortly after his return home, I was sorry to hear that the fits had returned, though in much slighter degree than formerly, and were threatening to become frequent. The medicine was continued. The fits were eventually completely prevented by imitating Boerhaave's expedient. The servant girl mentioned to his mother in his hearing, that, in her country, she had heard of people cured of fits by means of a red-hot iron applied to the feet during the fit. She was desired to have it in readiness; but there was no occasion to try it, for no fit ever returned. The fear of the remedy effectually prevented their recurrence.

Here it was obvious there was no organic affection; and the disease was kept up by habit. In fact, the change in the first instance from Glasgow to Edinburgh seemed to have considerably interrupted the habit.

ART. V.—*Observations on Atonic Congestion of the Brain.* By R. WADE, Surgeon to the Westminster General Dispensary, Lecturer on Morbid Anatomy, &c.

IN no other part of the body is it so difficult to detect the various causes of functional derangements as in the brain. From the endless varieties of susceptibility existing in different persons arise in a great degree the diversified intellectual and corporeal phenomena observed in similar alterations of structure and disordered states of circulation in that organ. The unsatisfactory nature of dissections in some cases in which symptoms of severe organic lesion of the brain had been observed, should teach us to hesitate before deciding upon the incurable or curable nature of its diseases.

The autopsy of many persons who have died apoplectic must afford convincing proofs, that mere obstruction in the cerebral circulation, or a morbid distension of the vessels of the brain, may cause equally sudden and fatal effects as the most extensive effusion of blood in the cranial cavity. The great variation in the phenomena of mania,—the recovery of some cases of that malady which had been attended by symptoms similar to those often accompanying serious organic disease of the brain, should induce us to persevere in the endeavour to relieve cerebral affections, however formidable in their appearance. Similar encouragement may also be derived from the history of epilepsy, persons having been cured of that disease who had suffered from it for years, in whom it might naturally have been supposed that considerable alteration of structure had taken place within the cranium.

From the complicated functions performed by the brain, acted upon, as it more or less constantly must be, by the various mental and corporeal impressions, many of them being painfully depressing or exciting, we may readily conceive the predisposition of that organ to a disordered state of its circulation. During the early periods of existence the brain is especially liable to increased action, or fulness of the arterial side of its circulation; and, in our advance towards old age, the predisposition to venous plethora becomes manifest. In early life, the most trivial causes, as the motion of a worm in the intestines, or a tooth confined in its capsule, often give rise to the most formidable convulsions or inflammation of the brain; but, when that organ has arrived at maturity, the same sources of excitement seldom produce similar effects.

It is evident that convulsions, delirium, and disordered sensation, may result from a deficient as well as excessive supply of blood to the brain. If it be insufficiently provided with arterial blood, its functions are imperfectly performed, and effects resembling those caused by cerebral pressure are commonly the result. If the action on the arterial side of the circulation in the brain be feeble for any length of time, the motion of the blood in the capillaries will most probably be retarded and the veins overloaded. The circulation of a vitiated or poisoned blood in the vessels of the brain may cause similar effects to those arising from cerebral congestion or effusion, as I have in a few instances observed to be the case in jaundice; patients suffering from that complaint having been seized with convulsions and coma, which soon ended in death, and in whom no organic lesion was discovered at examination after death. When the urine is no longer separated from the blood, the function of the kidneys being suspended, similar phenomena are also observed. If the free transmission of blood from the cerebral arteries to the veins become materially retarded, whatever may be the cause of the obstruction, the effects often very closely resemble those arising from pressure, as observed in effusion or tumours upon the brain. The symptoms are, however, usually less severe in congestion than in organic affections of the brain, although the most fatal and sudden form of apoplexy is sometimes, as before noticed, the result of the former.

Congestion of the brain may result from an increased impulse of blood, as often happens in hypertrophy of the left ventricle of the heart; from a diminished impulse, as is sometimes the case in passive dilatation of that cavity; or it may arise simply from *plethora.* There is, however, another species of congestion of the brain, in which the principal phenomena appear to be caused by local debility in the vessels as well as nerves of that organ, either partial or general, which, in contradistinction to the disease usually described by the above-mentioned denomination, I shall call *Atonic Congestion of the Brain.*

The more prominent symptoms of the disease are, a dull pain and sense of weight in the head, in some cases described as if something were crushing the brain; occasional stupor; also giddiness, which is commonly increased by looking up or down, and particularly when stooping. There is often dimness of sight, as if a film or cloud were passing before the eyes; noise in the ears, sometimes a sense of buzzing, at others like the ringing of bells. Coldness in some instances is experienced in one cerebral hemisphere, but not so frequently in both; the forehead often feels hotter than usual; the countenance is generally pale, and has a dull heavy appearance; the pupils are usually dilated and inactive; the vital powers more or less depressed, and sensation is in most instances materially deranged. In the severe forms of the disease, the prostration of strength is great, mostly felt in the inferior extremities, generally more on one side than the other, the weaker limb being carried forward with a dragging movement. Numbness, cramps, or tingling sensations are often present; and occasionally complete *hemiplegia* ensues; the paralysis is generally, however, incomplete. Convulsions in various forms may occur, from slight tremor to the strongest epileptic attack. In some examples of this disease, the functions of the fifth and seventh pair of nerves are remarkably disordered, evinced by the diminished or altered sensations, as well as the irregular muscular actions of the parts supplied by those chords. The sleep is sometimes very sound, accompanied by loud snoring; at others, the patient is very restless during the night, and often disturbed by frightful dreams. Various slight convulsive actions occasionally occur during sleep, observed particularly in the movement of the eyes, of the angles of the mouth, and in the jaws, by grinding of the teeth. The mind is more or less depressed; and much morbid susceptibility is usually present, the patient being frequently irritable, and agitated by trivial causes:—in some instances the sufferer is completely hypochondriacal. The surface of the body is generally pale, the features shrunk, the feet cold, and the skin has often a yellowish tinge; the pulse is always weak, usually small and accelerated, ranging from 80 to 130. Palpitations and *dyspnœa* are often experienced, especially on any bodily exertion or mental emotion; but rarely so constant or distressing as in organic affections of the heart.* The bowels are usually constipated, and the liver inactive; the fecal evacuations being often of a clay colour, although sometimes of a healthy appearance. The tongue is seldom much coated, and frequently remarkably clean; the appetite oftener deficient than otherwise.

Diagnosis.—Atonic Congestion of the Brain may be distinguished from inflammation of that organ, by the absence of febrile paroxysms, the skin being oftener cold and clammy than hot and dry; by the length of its duration; by the temporary relief generally experienced from stimulants, especially of the diffusive kind, as wine or brandy; in short, from the disease being unaccompanied by the combined symptoms indicative of inflammatory action.

From active congestion, or cerebral *plethora*, it is distinguished by the small weak pulse, pale countenance, and almost entire absence of throbbing of the carotids; by the want, indeed, of nearly all the signs of increased determination of blood to the brain.

It cannot easily be mistaken for dyspeptic *cephalalgia*, as in the latter the attacks are not only accompanied with considerable derangement of the stomach and bowels, but are more periodical, and usually subside after the restoration of the digestive organs to their healthy state.

Atonic congestion of the brain may be complicated with *anæmia.*

Etiology.—The causes of this disorder are various. The most usually recognized may be referred to one or other of the following heads:—Original conformation, or whatever depresses the vital powers of the brain, as long-continued irritation from *phrenitis* or febrile excitement, grief, terror, as a sudden shock, caused by witnessing an epileptic paroxysm; exposure to noxious *miasmata;* hemorrhage, the copious abstraction of blood, or other depletion; poor diet; continued exclusion from sun and air; passive dilatation of the heart; excessive venery, self-abuse.

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* In one case of atonic congestion of the brain in a girl 17 years of age, the palpitations were so constant as to cause partial absorption and protrusion of the cartilages of the sixth and seventh rib, forming a pulsating tumour, which gradually subsided as the cerebral disease improved. The patient was at length completely restored to health by perseverance in the use of the moxa.

The disease itself appears to consist in defective tone or energy of the brain and nerves, as well as deficient activity in the cerebral circulation, the blood passing more slowly from the arteries to the veins than is consistent with health. General venous *plethora* is frequently present. One cerebral hemisphere is generally more disordered than the other; in some cases the *cerebellum* seems to be chiefly affected.

The effects appear principally in diminished mental and physical energy, deranged states of perception, of sensation and volition, giving rise to the various symptoms previously described. In some cases where the action of the heart is extremely feeble, and the power by which the blood is propelled forward consequently much reduced, the vessels of the brain being also in a state of debility, the cerebral circulation often becomes so much retarded, especially in the recumbent position, that convulsions ensue, which seem to relieve the congestion for a time.

Proofs of Atony and Congestion.—That a deficiency of nervous energy, as well as a languid circulation, exist in some portion of the brain, or its membranes, is, I think, clearly shown by the relief which stimulants usually afford, particularly the application of heat, and also by the causes of the disease being directly or indirectly of a depressing nature. That more or less local congestion is present can scarcely admit of doubt, when the effects of caloric upon the part affected are observed; which effects are generally to improve sensation, to diminish the frequency, and increase the strength and fulness of the pulse; and in many instances to restore in a remarkable manner the mental and physical energies of the patient.

The *necroscopic appearances* are principally fulness of the veins and sinuses of the brain, with black blood, occasionally some effusion between the *pia mater* and *tunica arachnoides*, and sometimes in the ventricles. In the few examples of this disease in which I have had an opportunity of examining the body after death, there was less redness, either in dots or patches, than is observed to be the case in active cerebral congestion.

Treatment.—In head affections which evince a disordered state of circulation within the cranium, no other remedy is so highly esteemed as the general or local abstraction of blood. Whether the disease be inflammation, congestion, or cerebral *plethora*, the great relief experienced from the loss of blood is a strong temptation to the practitioner for its frequent employment. In many cases, that relief is but of short duration, although so complete for a time, that the patient earnestly entreats for, and the medical attendant probably consents to, a repetition of the venesection, until the natural restorative powers of the constitution become seriously weakened. That " the patient dies whilst the physician sleeps" is an old proverb. When, however, we place our chief and almost only reliance for the relief of inflammation upon the repeated abstraction of blood ; to make the proverb then applicable to ourselves, it should be, that the sleep of the physician is the salvation of the patient.

I believe that many cases of Atonic Congestion of the Brain are caused by profuse blood-letting, employed for the relief of inflammation of that organ. Before carrying venesection to any great extent in the treatment of *phrenitis*, it would be well for us to consider whether temporary relief may not be procured at the expence of subsequent mischief. If blood-letting be carried to the production of syncope or faintness, it often happens that the pain attendant upon inflammation will be completely relieved for a short time ; yet it will most probably return after the restoration of the heart's action, the essential part of the disease, the morbid sensibility remaining, unless, indeed, the mischief be completely subdued at its commencement. Are we then again and again to resort to the same remedial means until the vital source become so drained that to abstract a few ounces more blood might prove fatal ? I doubt whether any degree of inflammation in whatever organ it may occur, will justify such extreme depletion. It should be borne in mind that the capillaries of an inflamed part must soon become weakened by over-distension, and that congestion may supervene. To diminish the morbid sensibility of an inflamed part is surely as much an object as to lessen the *vis a tergo* upon the distended capillaries. Although blood-letting, when judiciously employed for the cure of inflammation, is a powerful agent in allaying the excited state of the nervous system, yet, when used to excess, a general morbid susceptibility is induced, extremely favourable to the continuance of the disease in a low form, terminating most probably in effusion or congestion.

If it be admitted that the best practice is that which subdues inflammation at the least injurious expenditure of the vital fluid, it will as readily be acknowledged, that after the employment, in the first instance, of full venesection, those additional measures for the relief of inflammatory action which experience has proved to be the best, should be promptly and assiduously used ; especially when the disease has attacked a part where its ravages may sooner or later affect the life of the patient. In the treatment of acute inflammation of the brain, after the employment of venesection to the production of faintness, according to my own experience, the cold affusion, as recommended by Dr Abercrombie, will be more useful than any other remedy in keeping down the reaction, as well as removing the sensibility of the part affected, and will, when properly managed, often render a second and generally a third bleeding unnecessary. Occasionally, however, notwithstanding the best treatment of *phrenitis*, it will terminate in atonic congestion of the brain, which frequently proves a very tedious disease, bidding defiance to the skill of the physician, and wearing out the strength of the patient.

In the treatment of inflammation or congestion affecting an external part of the body, there is this great advantage, that our remedies can be applied to the immediate seat of the disease. Next to the local abstraction of blood from the inflamed part, no remedies are more successfully employed by the surgeons than the application of heat and cold; and the nearer the inflamed organ to the surface, the more efficient is the relief obtained from the various stimulant and sedative applications.

Having often witnessed most excellent effects from the employment of caloric in the form of moxa in many external diseases where stimulants were indicated; having been also particularly struck with its great diffusive power, it occurred to me, that, in some forms of congestion of the brain, that remedy might be used with advantage. I had occasionally employed the moxa as a counter-irritant in epilepsy, as recommended by Baron Larrey; the pain caused by it was, however, so severe, that but few patients would consent to a second, and still fewer to a third application. I have, therefore, had no experience of the good effects of the moxa as an escharotic. It was with a very different view than that of counter-irritation that I had recourse to the moxa for the relief of atonic congestion; it was only in the hope that it might promote the healthy action of the vascular and absorbent system of the brain by its stimulating effect upon the nerves of animal and organic life; and so exert a salutary influence upon other organs. The mode of using the moxa which I have adopted is with the syringe, recommended by Mr Boyle in his work on Contractions of the Joints, so that the degree of heat can be regulated according to the feelings of the patient.

The first case of affection of the brain in which I used the moxa was the following. A girl, 17 years of age, had suffered from epilepsy for four years, and at the time of my first seeing her, the epileptic paroxysms recurred once or twice every twenty-four hours. Hemiplegia of the left side had existed for a year and a-half, that part having become gradually weaker and weaker, until complete paralysis ensued. The moxa was first applied to the sides and nape of the neck, with the view of stimulating the carotid and vertebral arteries. The application afforded great relief; but the remedy was afterwards used over the parietal region with more permanent good effects. As, however, the case is published in the London Medical and Physical Journal for June 1828, it is sufficient for my present purpose to state that the girl completely recovered. The particulars may be learned by reference to that publication.

The only additional treatment I have adopted in atonic congestion of the brain has been the exhibition of an occasional aperient; and in some cases from half a drachm to a drachm of the carbonate of iron three times a-day. Where the disease has long existed, great perseverance in the use of the moxa is required; in one or two instances, I have used it for more than twelve months, gradually increasing the intervals between its application. I have recommended persons who have suffered from the above-mentioned complaint, to take as nutritious a diet as the state of their digestion would permit; and a glass or two of wine after dinner, has generally been taken with advantage. If Atonic Congestion be accompanied with general *plethora*, blood should be abstracted previous to the use of the caloric. The best method of preparing the moxa is by dipping lint in a solution of nitre, (four grs. to the ounce of water,) and when properly dried, it should be rolled up lightly, of a sufficient size to fill the syringe. If made stronger, sparks will be emitted during its combustion, which are extremely annoying to the patient. The moxa will be found to have an excellent effect in the congestive state of the brain, which sometimes remains after attacks of typhous fever; and not less so in congestion of the spinal chord.

Case I. Mr Martin, aged 18, first applied to me on the 8th of January 1831. He complained chiefly of dull pain, with a sense of weight in his head, as if something were crushing it; also of giddiness, dimness of sight, and noise in the ears like the ringing of bells. The young man's countenance was pale, inanimate, and deficient in intellect; the pulse 88, small and weak; the tongue clean; and the secretions tolerably healthy. He suffers frequently from *dyspnœa* and palpitations; the pupils are dilated and inactive under a strong light; the pain in the head, as well as giddiness, are increased by stooping, and the latter is particularly experienced when looking up or down. A sense of coldness is often felt in the left parietal region; the prostration of strength is considerable, and the lad walks very slowly with the assistance of a stick, his limbs being drawn forward with a dragging movement. I learned from the youth's mother that her son had constantly stammered more or less; that, for some time past, he had slept with his eyes half open, the saliva running from his mouth, and breathing with a loud snoring noise.

General and local bleeding, active purgatives, and blisters to the nape of the neck had been the principal remedies adopted. He informed me, that his head was generally relieved for a few days after bleeding; but that no permanent amendment followed any kind of treatment; that his application to me was caused by the strong recommendation of a patient of mine who had derived great benefit from the moxa. As it seemed very probable to me that the symptoms might all arise from atonic congestion of the brain, I resolved to give the moxa a fair trial.

Two moxas, held about an inch and a-half from the skin, which had but little sensibility, were burnt slowly over the integuments of the head. The next day, on the 9th, when the pulse was much as before, but with more sensibility in the integuments, the moxa was used to the head and neck. 10th. The sense of weight in the head rather less. Two moxas to the head and nape of the neck; there is more sensibility in the integuments to-day. The patient complained of nausea, and a sense of trickling, like water running in the left cerebral hemisphere, when the moxa was applied to that region; on its application to the nape of the neck, little heat was felt in that part; but chiefly in the forehead, which effect I had observed in another case. 11th. Great relief obtained since yesterday. The patient has more animation, and says, that, after the last application of the moxa, he felt as if a weight had been removed from his brain; the pulse is 84, and increased in strength. His mother tells me, that he slept last night with his eyes nearly closed, and without snoring. 12th. Not so well this morning; complains of weight and pain in the head; also slight dimness of sight; pulse 80, small and weak. As the lad felt quite as well as yesterday before leaving home, the unfavourable symptoms are probably owing to a very dense fog, which always has made him worse; his articulation is now, however, without the slightest hesitation. Two moxas were applied, and their effect to-day was more remarkable than usual, the pain and weight in the head, as well as dimness of sight, being completely removed by the first moxa; the sense of heat is also more diffused than before; the pulse reduced to 72, and increased in strength.

13th. No pain in the head; pulse stronger; a sense of coldness is felt in the left cerebral hemisphere; the moxa afforded complete relief. The moxa was applied on the 14th and 15th with its usual effect.

17th. The moxa was omitted yesterday, and the patient does not feel quite so well; but he was immediately relieved after its application to-day.

19th. The moxa was used yesterday and to-day; the pulse is much the same.

21st. The moxa was applied yesterday. There is a little pain and weight in the head this morning, which is very foggy. Two moxas used.

26th. The moxa has been applied regularly until yesterday, when it was omitted. The patient says he feels better than he has done for several years. Two moxas were applied on the 28th, 29th, and 31st; none were used on the 1st or 2d of February.

February 3. The patient has no unpleasant sensation in his head. Three moxas applied; the heat is now felt quite through the head, from one side to the other; pulse 80, full and soft.

The moxa was applied every alternate day, until the 14th, when it was discontinued at the patient's desire, as he had no uneasy sensation in his head.

March 3. The lad came this morning to have the moxa applied, and, with the exception of an occasional slight dimness of sight, has felt quite well since his last visit. He used to suffer much from pains in the left side of the neck, face, and teeth, which pains have now entirely subsided. He walks without a stick; there is no dragging of the limbs; nor the least hesitation in his speech; the pulse 80, full and soft. The moxa was used about once a fortnight or three weeks, until July 18th, when the patient discontinued his attendance. I saw him some months afterwards, when he remained quite well. The only additional treatment adopted by me was the administration of an occasional aperient, and latterly, a drachm of the carbonate of iron, three times daily.

CASE 2. Ellen Sullivan, aged 20, first applied to me on the 17th of March 1831, and stated, that, about two years ago, she had a severe attack of brain fever, attended with delirium, acute pain in the head, soon followed by almost constant insensibility, which lasted three weeks; during which time she was bled seven times in the arm, and cupped twice on the nape of her neck. Her health was much impaired ever since the above-mentioned illness; having been subject to occasional giddiness, especially when stooping; dimness of sight; a sense of weight in the head, sometimes amounting to pain, increased by the recumbent position. The catamenial discharge has been very irregular and deficient. The girl sleeps very soundly, and on first awaking, feels for a few minutes quite deranged. An epileptic attack first occurred about six months ago. The fits afterwards recurred every five or six days, but for the last two months they have very much increased in frequency. Scarcely a day now elapses without the occurrence of one, and sometimes three, epileptic paroxysms.

The remedies which had been used for the epilepsy previous to her application to me were venesection, purgatives, and afterwards tonics, amongst which is included the nitrate of silver. The patient has invariably been relieved for a short time after the abstraction of blood. Cold applications to the forehead have generally increased the sense of weight and uneasiness in the head. The girl at present complains of frequent palpitations; a feeling of coldness in the right parietal region; weakness and dragging of the left inferior extremity, with occasional spasmodic contraction of its muscles; it appears to the patient to have less warmth than the other. The pulse is 100, very small and weak; the tongue is clean, and the bowels act regularly.

Two moxas were burnt over the right parietal region, after which the girl said that her head felt lighter, and her sight clearer. March 19th. Pulse 90; no fit since the application of the moxa, although the usual premonitory symptoms of the epileptic paroxysm appeared yesterday morning. Two moxas as before, which caused a sense of throbbing in the head, and of something blue passing before the eyes; the weight in the head was relieved, and the pulse fell to 72. The moxa was used on the 20th, but omitted on the 21st. A fit of short duration occurred before the patient came to me on the morning of the 22d. Two moxas were applied with their usual good effects. 23d. There is now but little giddiness or sense of weight in the head; the girl has experienced no pain since the first application of the moxa; her side is gaining strength, and there is no confusion of thought on first awaking. Two moxas used, one over the right parietal region, the other to the nape of the neck. The greatest relief was obtained from the first. Two moxas were used on the 24th, 26th, 27th, and 28th. The report on that day is, that no fit had occurred since the 22d, and that no uneasy sensation existed in the head. The moxa was continued every other day, until April 2d, during which time no uneasy sensations had been experienced in the head. The girl has, however, once or twice felt a sense of tingling in the weak side The moxa was used as before. April 4th. Two slight fits occurred yesterday, which were not preceded by the usual signs. The moxa was applied to-day, and on the 5th, 6th, 7th and 8th, then omitted until the 12th, when it was again used, and occasionally until the 20th, when the patient said she had felt quite well since the last fit; the pulse is 64, soft and full. She promised to return to have the moxa applied if any unpleasant symptoms came on. I have therefore every reason to conclude that the girl had no return of her disease.

Case 3. Mr Onwhyn, aged 20, first consulted me on the 12th of December 1831. He complains chiefly of weight in the head, occasional stupor and giddiness, which is increased by looking up or when stooping; he has difficulty in fixing his attention for more than a few minutes on any subject, his ideas becoming confused; his feet are very cold, and frequent attacks of palpitation are experienced. The pulse is 76, small and weak; the pupils dilated, and very inactive under a strong light; tongue clean; bowels rather confined. Two moxas were applied to the head; but the heat was not felt beyond the skin. December 14th. Two moxas used; more sensation in the integuments; the head was much relieved, and the pupils became more active. 15th. Patient complains to-day chiefly of giddiness; the warmth felt deeper than before, and the head quite relieved. 16th. The patient can look up or down without giddiness. The moxa used as before. The moxa was used until all unpleasant symptoms of the disease had disappeared, with the exception of a slight giddiness after unusual exertion, or getting damp feet. The young man then went into the country. I understand he has occasionally experienced some of his former unpleasant symptoms, but at present enjoys very good health.

Case 4. On the 25th of March 1831, I was requested to visit Benjamin Long, aged 26, residing 10, Litchfield Street. The young man has a very idiotic expression of countenance; his head is unusually small, and he answers questions with an unmeaning laugh. From a very early age, he has been subject to pain in his head; and convulsions frequently occurred when he was affected with the hooping-cough, and whilst cutting his teeth. About seven years ago, after a hard day's labour under a hot sun, he experienced more than usual pain in his head, succeeded in two days by an epileptic fit. An interval of three months elapsed before the next attack of convulsions, since which time they have gradually increased in frequency; and now occur at least once a-week, when he has two or three fits during the twenty-four hours, each attack lasting from ten to fifteen minutes. He complains much of a dull pain and sense of weight in his head, of restless nights, also occasional giddiness, which is increased on looking up or down, of dimness of sight and noise in his ears. His eyes are very red from distension of the vessels under the *conjunctivæ;* his memory has latterly been extremely bad; he suffers much from dyspnœa and palpitations; the pulse is 92, soft and small; the pupils inactive and dilated; the prostration of strength is great. Bleeding, both local and general; blisters, setons and purgatives; also various tonic medicines had been at different periods employed for his relief; but none of them with any permanent benefit.

Two moxas were burnt over each parietal bone. March 27. Two moxas used as before. The patient is more sensible, and says that he has felt more relief from the moxa than any other remedy; the sense of weight in the head, as well as giddiness and dimness of sight, having much diminished. I was informed that, an hour or two after the first application of the moxa, the conjunctival redness had entirely disappeared, which redness, I may here observe, never returned during my attendance. 29th. Four moxas used; no complaint of the head to-day. 30th. A fit of short duration at nine o'clock this morning. Three moxas applied with great relief. April 2d. Two moxas used yesterday and to-day. The patient can look up or down without giddiness; sleeps well and gains strength; the pulse is 84, soft and full. April 5th. A fit at eight o'clock this morning; on my visiting the patient at ten A. M. he was sitting up in bed, apparently without consciousness. Two moxas were applied; after which he spoke and expressed himself much relieved. April 15th. The moxa has been used every day. The patient this morning experienced some stupor, the usual precursor of the epileptic seizure; but no fit occurred.

It is sufficient to state, that the moxa was used every alternate day until the 30th of April. Since that time I have never seen the patient; but on inquiry I was informed that he and his mother had been obliged to leave their lodging from distress, and it was supposed had gone to live in the country. The last time the moxa was applied the young man was better than he had been for several years.

CASE 5. Thomas Davenish, aged 28, applied to me on the 4th of July 1832. He had been subject from infancy to occasional pain in his head. Ten years ago he had an attack of fever, which left a general paralytic weakness. The man walks with crutches; the dragging of the left inferior extremity is greater than the right. When endeavouring to move his arms or hands (which he is unable to raise to his mouth) they are affected with slight tremors. He suffers greatly from a dull heavy pain in the head, occasionally of an acute lancinating character; also from dimness of sight and giddiness, especially on looking up. The pulse is 120, small and weak; and he is very drowsy. The patient had been repeatedly cupped, leeched, and blistered, with but slight relief to the head.

Upon the application of two moxas to the head, the pulse fell from 120 to 100, and became stronger. July 5. Two moxas used; the pulse before their application was 104; afterwards, 92. The moxa was occasionally applied for three months; after which all uneasy sensations in the head had subsided. The paralytic weakness remained much the same as before the application of the moxa. I saw the man some time afterwards, when he had had no return of pain or giddiness in his head.

CASE 6. Mr Habell, aged 25, applied to me, November 5, and stated that, two years ago, he had had an attack of inflammation of the brain, which caused insanity, for which he was sent to St Luke's for nine weeks. He has been subject to headach from infancy. At present he complains chiefly of a sense of dull heavy pain in the head, occásional giddiness, stupor, and dimness of sight, the giddiness being increased by stooping or looking down, or lying on the right side. The pulse is 96, small and weak; the tongue clean; the countenance very pale and depressed; and the pupils inactive. The left side of the body is weaker than the right. He occasionally suffers from cramps in his limbs, and for a few minutes after awaking feels much confusion in his ideas.

Four moxas were applied over the right parietal region; there was but little sensation in the integuments. After their application the head felt lighter, the pulse fell to 80, and became more full. Nov. 6. Head feels lighter; less giddiness and dimness of sight; pulse 84, small and weak. The patient felt a sense of tingling in the right parietal region four or five hours after its application yesterday morning. Three moxas applied as before; the pulse became fuller, and fell to 72. The moxa has been occasionally applied to the present time January 31, and in no instance have I observed its good effects more. Once or twice during damp weather the patient has had a slight return of the uneasy sensation in his head, which the application of the moxa has quickly relieved. I saw the man this morning, February 5, when he had no uneasy sensation in his head.

This paper, in an abridged form, was read before the Westminster Medical Society on the 31st of January. The author trusts that a sufficient number of facts have been brought forward to excite the attention of the profession to a disease, for which he cannot but think that depletion has often been most injuriously adopted. The remedy recommended by him will, he is convinced, if properly persevered with, be found of great advantage in the treatment of that most obstinate and tedious class of cases for which he has ventured to recommend its adoption.

68, *Dean Street*, *Soho*, *Feb.* 5, 1835.

ART. VI.—*Cases and Notes relating to several points of Pathology and Practice.* By WILLIAM HENDERSON, M. D.

CASE I. *Empyema.*—The subject of the following observations was a patient of Dr Shortt, by whose permission this notice is given. The phenomena presented by the conditions of disease existing in the thoracic cavity having been of so unusual a nature as to baffle the acuteness of several experienced auscultators, it is hoped that a detail of the case may not be void of utility.

Hugh White, aged 26, an artillery-man, was admitted into the Edinburgh Infirmary on the 11th of February 1834. He was affected at the date of his admission with a good deal of cough, and viscid expectoration in small quantity. He made no complaint of pain, but stated that he had a sense of weight in the chest. There was considerable dyspnœa, and occasional night-sweats, which were usually very moderate. He did not confine himself to any one position in bed, but reclined with most ease on the left side. He reported his general health and strength to be good, appetite natural, and bowels regular. The tongue was clean; pulse not exceeding 80; and the general aspect of the body plump and fleshy.

The heart beat betwixt the fourth and sixth ribs on the right side of the chest, about the line of their union with the cartilages. The sound elicited by percussion was everywhere dull on the left side of the chest, except over a space about the breadth of the hand, extending from the second to the sixth cartilage. In the latter situation, and over the whole sternum, the sound of percussion was very clear, and not in the smallest degree affected by changing the position of the body. The murmur of respiration was absent from every part of the left side; nor was any morbid sound created during the respiratory efforts, nor by coughing, speaking, &c. except at the place already indicated as having given a clear sound on percussion. Here, when a full inspiration was made, a distinct mucous rattle was heard,—but did not appear to be produced by the ordinary movements of respiration;—at the same place also bronchophony was well developed, but no bronchial nor cavernous respiration was at any time audible. No thrill was communicated to the hand, when the patient spoke, at any part where percussion was dull,—but at the resonant part the thrill produced by the voice was very perceptible.

On the right side of the chest, the phenomena usual in health were not perceptibly altered, but at the new position of the heart, where the sounds, &c. were exactly as commonly observed on the left. No difference in the capacity of the sides could be detected by careful mensuration; but the lines of the ribs could be rather more distinctly traced on the right than on the left side.

The following is the substance of the history the patient gave of himself.

About a year ago he became affected for the first time with complaints in his chest, which consisted chiefly in pain of both sides, and difficulty of breathing. Although the remedies then used sufficed to remove the severer symptoms of his disease, he continued subject to *dyspnœa.* About four months before admission, he first remarked that, when he turned in bed, or moved his body suddenly in any way, a splashing sound proceeded from the left side of his chest; and very shortly after, he observed the pulsations of the heart at the right side of the sternum. The splashing sound he had not heard for two months before he came into the Hospital.

Having ascertained the foregoing facts by careful examination, the case was considered to be of the following nature,—an opinion delivered in my clinical lecture to Dr Shortt's pupils.

I conceived that the phenomena presented by the greater part of the left side indicated the existence of a large quantity of fluid in the cavity of the *pleura*, to which alone, indeed, could be referred the displacement of the heart. It seemed also a matter of certainty that the lung, as usual, was compressed towards the *mediastinum*, so far, at least, as the existence of disease in its tissue would admit. That considerable disease in the tissue of the compressed lung did exist appeared in the highest degree probable, from the circumstance, that a space of six inches or more intervened between the displaced heart and the nearest point of the accumulated fluid; and the substance of the lung must have been in some degree condensed by a new deposit, before it could have transmitted the pressure of the fluid over a space so considerable to the heart. That this space, occupied by a portion of lung evidently in a state of condensation, independent of mere pressure, should have given forth a clear sound on percussion, was a striking fact in the pathology of such affections, and became intelligible on having considered the condition of the lung in certain cases of tubercular formation, in which the sound of percussion continues often very clear, although the pulmonary texture be intermingled with numerous patches of tubercles. The lateral pressure, too, of the fluid on the bronchial tubes leading to this lung was supposed to have had the effect of retarding the return of air drawn into the partially condensed lung during the inspiratory efforts of *dyspnœa*, and of thus maintaining the cells which still remained unobliterated, in a state of permanent distension. That such impediment did exist to the transmission of air by those tubes appeared from the absence of sound in the resonant part, except when a vigorous inspiration was made.

The history of the case rendered it highly probable that the *empyema* had supervened on *phthisis*, from the bursting of a tubercular abscess into the cavity of the *pleura*,—whence the splashing sound which occurred at the commencement of the *empyema*.

The foregoing views of the condition of the lung rendered an operation for the removal of the fluid unadvisable, unless much distress should arise from the excessive accumulation. About the beginning of April little change had taken place in the general condition of the patient,—but the diseased side of the chest had increased in size, and considerable uneasiness resulted from the extreme distension. A small quantity of the fluid was therefore evacuated by paracentesis at the back part of the chest, and afforded relief. At repeated intervals the operation was renewed, and various quantities of sero-purulent matter removed,—from two to five pounds at a time. Latterly the wound was left open, and the matter permitted to flow freely away on the dressings. The lung showed no tendency to regain its former dimensions; that part of the chest formerly resonant became gradually duller on percussion; hectic symptoms rapidly increased, and death took place early in June.

After the first or second operation he expectorated a considerable quantity of fetid pus, and then stated, that, some time before admission into the house, he had brought up similar matter, rendering it probable that a communication had early existed between the *bronchi* and cavity of the *pleura*, which had become impervious from subsequent pressure.

Dissection.—The left cavity of the chest contained several pounds of discoloured purulent fluid; the surface of the *pleura* was covered with a thick layer of pultaceous matter; the lung was thrust towards the *mediastinum*, and fore part of the chest, occupying in front the space behind the left cartilages and *sternum*. At the back part of the compressed lung there was a considerable deficiency of the *pleura*, and here an appearance of excavation existed. From this excavation several oblique canals led into a large *bronchus*. The substance of the lung was loaded with tubercles, especially at the fore part, where they had advanced to the softened stage, but had produced no cavities. The heart had made little progress towards its natural site, owing to adhesions contracted by the left lung. The right lung contained numerous scattered tubercles.

One remark only remains to be made on this case, derived from the facts that the patient lived for six months the subject of *empyema* combined with tubercles, in a very tolerable state of health, and died in a third of that time, after the evacuation of the fluid,—a caution, as has been observed by others in cases nearly similar, to refrain from *paracentesis* in all cases of *empyema*, in which there is any suspicion of tubercles, the removal of the compressing fluid appearing to give scope for the developement of the more fatal disease.

CASE II. *Pericarditis.*—A married woman, aged 36, became affected, on the 13th of March 1833, with violent palpitations of the heart, consequent on sudden mental agitation. These continued with much severity during the night. On the following day I was called to attend her, and found the action of the heart tumultuous and rapid, producing a violent shock simultaneously with each sound, so as to be strongly perceptible over almost the whole anterior part of the chest. The sounds in the cardiac region were remarkably loud and clear, but in no other way different from their usual tone;—they were very perceptible also over all the fore part of the chest. The back was not examined. The respiration was neither rapid nor laborious, but accompanied by a sense of much oppression, and pain referred to the situation of the heart. Pulse very small, wiry, and irregular, sometimes moderately slow, at others rapid and intermitting. She had expectorated some blood in small quantity during the morning. Countenance anxious; bowels open; skin natural; feet and ancles œdematous; body moderately robust. She had been nursing for some months.

It appeared that, two years before, she had been afflicted with rheumatism to such a degree as almost to deprive her body and limbs of motion. A state of palpitation and uneasiness, said to have been similar to that now described, at length supervened, and her rheumatic distress subsided; nor had she been since then affected with the latter; but had become liable to *dyspnœa* and increased action of the heart while exerting herself in any way, especially by ascending a stair. During periods of inaction these symptoms did not present themselves.

About eight months before I saw her, she had a return of the acute affection, which was again gradually subdued by blood-letting, and a vesicating application of hot water to the region of the heart.

Blood-letting from the arm to the extent of ℥x. having excited sickness, I ordered sixteen leeches to the site of the heart, and prescribed an antimonial mixture. In the evening I found that the symptoms continued unabated, with the exception of some relief to the oppressed breathing, and that the leeches had not been applied. Eight ounces more were taken from the arm, followed by faintness, regular pulse about 50, and vomiting. As the faintness went off, the circulation resumed its rapid and irregular character. The violence of the pulsations of the heart, however, was lessened. Leeches were again ordered.

Next morning I learned that ten leeches had bled well, and that the relief produced soon after their application was considerable. The œdema of the limbs had disappeared; the feeling of anxiety and restlessness was abated; the pulse 110, still irregular, small, and soft, at the wrist; the beating of the heart still tumultuous; and the blood cupped. A few hours after, she became affected with pain in the left shoulder and back of the neck; and about the same time remarked that the violent action of the heart had ceased.

At my evening visit I found the pulse at the wrist 80, soft and regular, and the beat of the heart nearly natural, she was also free from pain, and felt in every respect well.

After a lapse of several months, I had an opportunity of again examining this woman, and of tracing her history till the fatal termination of her disease. The *dyspnœa*, and strong action of the heart, to which she had been subject during bodily exertion, continued to recur with more frequency and severity, and in more prolonged paroxysms. At length these symptoms became permanent, undergoing variations merely in degree. The action of the heart became perceptible over a preternaturally extensive space, the sounds became unusually loud, but the impulse exceeded very little the ordinary intensity,—signs indicative of enlargement of the organ more from dilatation than hypertrophy. After much suffering during the latter part of her illness, she died about five months after my first attendance.

The appearances presented on dissection accorded well with the course of the symptoms. The cavities of the ventricular portion of the heart were considerably dilated, but did not possess a corresponding diminution of thickness, thus constituting eccentric hypertrophy with a preponderance of dilatation. One or two small vegetations, of a warty firmness, grew on several parts of the mitral valve. The *pericardium* adhered to nearly the whole surface of the auricles, and a considerable portion of the contiguous ventricles was roughened with hard granules of lymph of no recent date. Traces of pneumonia and pleurisy existed in the other organs of the chest, in the form of considerable serous effusion, and one or two patches of hepatization.

It is certainly a remarkable circumstance in the phenomena of rheumatism,—and the observation is not new, that when the heart has become involved in the disease, the disposition to a renewal of the affection in less important organs appears to subside. The foregoing case is a striking instance of this exclusive and fatal tendency. The subject of these remarks had experienced complete and permanent relief from a severe rheumatic affection of the limbs and various parts of the body, after the heart had become implicated. The sudden disappearance of the symptoms of *pericarditis*, and the simultaneous, though transient, rheumatic affection of the neck and shoulder, present the characters of metastasis, and seem to warrant the conclusion, that the acute disease of the heart was of a rheumatic nature, though occurring nearly two years after the last appearance of rheumatism in other parts of the body.

Pericarditis admits in general of more speedy and effectual amelioration from vigorous local treatment, especially local abstraction of blood, than from any other means, even the most copious general blood-letting. In this particular it accords with the usual character of rheumatism, and induces the suspicion, that in many more cases than can be traced to connection with a previous rheumatic tendency, *pericarditis* and the accompanying affection of the muscular tissue of the heart may be in reality a rheumatic disease. That the heart, when once implicated in this disease, should become the most frequent seat of its future attacks, may be understood to result from its state of unremitting action, whereby it is rendered peculiarly liable to the recurrence of a disease, which usually selects some situation previously affected as the chief seat of its future aggressions.

Case III. *Disease of the Mitral Valve.*—Dr Elliotson somewhere remarks that he never saw but one case where an opening leading from an auricle was materially narrowed, in which the disease was not indicated by a preternatural or morbid sound during the contraction of the auricle, or, what according to his views, is the same thing, at the usual period of the second sound. The experience of others has been of a very different nature. From among several cases which have occurred to me, of contraction of the mitral orifice unaccompanied by preternatural sounds, I select the following as the most remarkable.

A man about 60 years of age, who had laboured under symptoms of diseased heart for nine or ten months before I examined him in December 1833, presented the following signs. There was good resonance of the chest anteriorly, except at, and for some distance around, the situation of the heart. In this place and considerably to the left of the usual position of the organ, the sound of percussion was dull. The impulse of the heart was barely to be detected by the hand; but by the medium of the stethoscope, a widely diffused shock could be distinctly enough discerned. The sounds were without any admixture of roughness, blowing, or other morbid tone; and it could scarcely be said that they were louder than natural, yet they could be heard over a more extensive area than usual. They occurred in rapid but regular succession; and the pulse at the wrist was very small, soft, and much accelerated. The respiratory murmur could nowhere be heard in front, owing to the prevalence of bronchial rattles. At the back part of the chest the resonance of percussion was impaired, and bronchial rattles prevailed to a great degree. There was œdema of the extremities and of the body; the face was tumid, and the lips livid; the respiration unequal, expiration having been prolonged; little cough; much dyspnœa; and the position chiefly recumbent.

On dissection a few days after the foregoing facts were ascertained. The *pericardium* was found to contain five or six ounces of fluid, and the heart to be prodigiously enlarged. The enlargement arose chiefly from much dilatation, with hypertrophy, of the left auricle and ventricle. The right cavities were likewise dilated, but to a more limited extent. The mitral valve had undergone so considerable a change that the opening from the left auricle was only four lines in diameter. The opening was of a round form, and circumscribed by an almost cartilaginous firmness of the portions constituting the valve. There was watery effusion in the cavity of the *pleura* and in the tissue of the lungs.

A heart so much dilated and hypertrophied as that just alluded to might be presumed to have been accompanied with much more sound and impulse than actually occurred. The deficiency of the usual signs of considerable dilatation and hypertrophy appears to me to have been owing to the presence of fluid in the *pericardium*; for I have repeatedly remarked the coexistence of such effusion, even to the moderate extent of five or six ounces, with very obscure symptoms of the eccentric hypertrophy existing in the ventricles.

On the use of Strychnia in Amaurosis.—After a pretty extensive observation of the effects of *strychnia* in *amaurosis*, I cannot say that I have a good opinion of its general efficacy. I allude to the subject now, not for the purpose of recording the disappointments this medicine has afforded in practice, but to suggest its use in circumstances under which its administration may be of advantage. In the many cases of *amaurosis* which are gradual in their progress, and in which irremediable change in the nerve of vision is slowly establishing itself, little attention is often paid to the symptoms thus insidiously advancing, until recovery of the impaired sense is either very difficult or altogether unattainable. Medical advice may have been asked before the evil had become so serious; but the remedies usually most efficacious may have appeared of too irksome a nature, and may in consequence have been neglected, while the patient has contented himself with hoping for spontaneous amendment. Under this class of cases it is of principal importance to include, as being peculiarly subject to neglect, *amaurosis* involving one eye only, and the circumscribed form of the disease assuming the nature of a coloured or simply dim spot. Many cases of this class may be remedied by the use of *strychnia* in the formula I am about to mention, if early adopted. Its advantage consists, not in its possessing greater efficacy than all other remedies, but in its capability of being administered with ease and convenience, at a time when most other methods of treatment would be considered by the patient more grave than the occasion appeared to require.

The formula I have been in the habit of using consists of two grains of *Strychnia* dissolved in one drachm of diluted acetic acid, and one ounce of distilled water. A few drops of this solution of *strychnia* may be poured upon the affected eye at intervals each day. The solution may be made, during the progress of the treatment, three or four times the strength of the above with advantage. The effect produced by this collyrium appears to me fully to equal that resulting from the endermic mode of applying *strychnia*,—a circumstance which should give it a preference over the latter in all cases of *amaurosis* supposed to require the exhibition of this drug, as the frequent blistering required in the endermic practice is always irksome, and not unfrequently dangerous, from its liability to produce erysipelas.

In a case of long-continued amaurotic affection of one eye, consisting of a spot in the field of vision possessing a green colour, and causing irregularity of the objects disposed around it, a weak solution of *strychnia* used in the manner recommended for about a fortnight, diminished the depth of the colour, very materially lessened the size of the spot, and corrected in a great measure the irregularity of the figures in its vicinity. The affection had, however, continued for a good many years, and lost its ameliorated condition soon after the collyrium was discontinued.

In another case of long-continued *amaurosis* of one eye, which had rendered the organ for more than a year totally insensible to the stimulus of light, the use of the solution for two or three days restored the function so far that light, and the passing of an intervening object, could be perfectly distinguished. But the patient had become so habituated to the use of one eye that the condition of the other was little regarded, and the experiment for its improvement was soon neglected. The improvement produced by the solution still continues, although a year has elapsed since it has been used.

Several cases of amaurosis in both eyes, which I had been previously treating with *strychnia* in the endermic way, have received additional benefit from the solution,—but, as their progress has not been great, it is unnecessary to enter into details.

21, *St Andrew Square, February* 1835.

Art. VII.—*Case of Delirium Tremens treated by Depletion and Opiates.* By A. Stephen, M. D., Portobello.

As some difference of opinion, I believe, exists among medical men regarding the best and safest method of treating this disease, I beg to submit a pretty severe case which lately came under my notice, should you deem it worth insertion in the Edinburgh Medical and Surgical Journal.

I must, however, premise, that I neither wish, nor do I feel myself competent to say, what mode of practice may in general be most prudent to follow; but merely to detail the case as it occurred, and the plan of cure adopted, without reference to any dogma.

Mr B. aged about 40, of a stout and athletic make, has for some years past been a good deal addicted to the intemperate use of ardent spirits, although refraining from them at other times for months together, when suddenly the craving comes upon him, and is too frequently indulged in, for days, perhaps weeks.

In one of these late Bacchanalian orgies, strange and unwelcome visitors seemed suddenly to intrude themselves on his privacy, when going to bed, and so discomposed him, that the inmates of the house had much difficulty to prevent his immediately quitting it. He, however, succeeded the following evening in effecting his escape, and wandered about all night. He was brought to his friends next day full of horrors, and in all the agony of painful excitement, firm in the belief that he was constantly followed by some unearthly being, bearing a warrant of commitment to the regions below. He soon after became very ungovernable, when I was requested to see him. It is hardly possible to form an idea of any one seemingly under more intense suffering of both mind and body than my patient when I first beheld him. He complained, or rather bellowed out, about the dreadful agony of an iron rod passing through his brain, and an iron hook in his cheek; which, combined with the belief that some unseen monster was digging from under him, and that he was about being precipitated into the bottomless pit, made him yell with the most frightful apprehension.

The pulse was very quick, but could not be counted from the incessant motion of the hand and arm. The veins of the neck and face were much swollen and turgid. Had the case been less violent, I should probably have had recourse to the tartrate of antimony, so much recommended in the cases of this Journal, No. cviii.; but as matters now stood, it appeared to me that depletion alone could give him relief; and, indeed, by the time I had abstracted thirty ounces from a large orifice, occasioning some degree of nausea, and tied up the arm, there was little more said of the iron rod and hook.

The other mental illusions, however, continued unabated, and it was with the utmost difficulty he could be got to bed, and when there, kept in it, from the dread of it immediately sinking under ground. Seventy drops of laudanum were now exhibited, and cold vinegar and water applied to the forehead and scalp, the hair being thin.

I remained with him for an hour and a-half, and thirty drops more were given, the former dose having had no effect. On calling an hour after, at 4 P. M. I found him sleepless and very restless, tossing incessantly about the bed, snatching at the bedclothes, at one time fancying that he saw a little hand, at another a mouse, and again an imaginary kind of ornament, which he called the Devil's ring on the little finger, and which, as a piece of annoyance, was not easily got rid of.

It was, however, quite evident by this time that the most alarming symptoms of the complaint were giving way; and even the mental hallucinations were comparatively of a trivial nature to what they had been; but as they kept him in a constant state of restlessness, with the pulse still quick, and the eye suffused, I had no hesitation in again opening the vein, and taking from 15 to 20 ounces of blood. After this he became much calmer; and a brisk cathartic was given, followed by some senna. At 6 P. M. the characteristic symptoms had almost entirely abated; but still very little sleep ensued. He now became clamorous for spirits; and knowing that the sudden withdrawing of stimuli to one so much accustomed, especially when depletion had been carried so far, often retards the recovery of the patient, I indulged his wishes by giving a glass of whisky in a little water, with permission to allow some more in an hour, if urgently asked for.

At 9 P. M. I evidently saw that no great benefit had resulted from the allowance of spirits, it seeming only to have the effect of making him clamorous for more, so that a bottle was now insisted upon to be placed at his bed-side. This determined me to discontinue it altogether, and to substitute an anodyne, believing, that, if sleep could be induced, and the nervous irritation allayed, all wish for spirits would subside; accordingly seventy drops of the solution of morphia were given. At ½ past 11 P. M. I found my patient tranquil, but could not understand that he had enjoyed any repose. Forty drops additional of the muriate of morphia were exhibited, and soon after he fell into a tranquil sleep. On calling next day at 9 A. M. I learnt from the man in attendance, that he awoke two or three times, and asked for a drink of water, and was quite collected, and soon fell asleep. No demand for whisky was ever made after. At 1 P. M. when I saw him, he expressed himself as being quite well, having made a hearty breakfast, instead of taking some solution of salts with senna, as I had requested. With a pulse at 80, however, I saw that I had no great reason to find fault with his predilections. The bowels were freely opened in the course of the day, and he went into the dining-room in the evening, looking better, his relations said, than he had done for the previous ten days. The colocynth pill was continued for a few days longer.

The blood drawn had no buffy coat, but the coagulum was firm, but with little serum.

ART. VIII.—*Observations on the Nature and Treatment of Cholera.* By EDWARD GREENHOW, Esq. Surgeon, North Shields.

NOTWITHSTANDING all that has been written and said respecting malignant cholera, the profession are still at variance as to its true nature and mode of treatment; and now that it appears to have established itself as a permanent disease of the country, it becomes a matter of increased importance to collect every thing that is calculated, however remotely, to throw a light upon the subject.

With this object in view, I have been induced to throw together such observations as I have been enabled to make upon its nature, and upon the treatment which I have found the most useful, during the three visitations which this town has sustained.

It is necessary briefly to recapitulate the symptoms from the commencement of its attack, in order to render fully intelligible what is to follow.

The first symptom is diarrhœa; and this is in no way distinguishable from common bilious diarrhœa, being preceded by a sense of weight and fulness in the *abdomen*, which is relieved by the first loose evacuation, and the patient congratulates himself that the complaint is passing off. The distension and uneasy feelings, however, soon recur, and are again relieved by renewed purging, and thus the sufferer is led on to defer applying for medical advice. After a time, the duration of which is very variable, being in some instances a few hours only, in others a lapse of several days, the evacuations become pale-coloured, or not unfrequently quite white. It is now generally that vomiting supervenes, great prostration of strength is experienced, thirst begins to be intolerable, the urine becomes scanty, or is totally suppressed, and cramp attacks the lower extremities, becoming more general as the disease advances. In a short time the evacuations lose their white colour, and become transparent like water, with flocculi at the bottom, resembling chopped rice, and the fluid ejected from the stomach assumes the same appearance. The whole body becomes cold, shrunk, and livid, the eyes sunk, and the voice a husky whisper; the pulse has been getting more feeble and rapid, and is now scarce perceptible; the skin takes on the same action as the mucous membrane of the stomach, and bowels, and pours out a profuse cold perspiration; and death is not long in closing the scene.

From consideration of the above-mentioned symptoms, it appears, that the first morbid impression is made directly upon the mucous membrane of the intestines; and this appears the more probable from the absence of constitutional disturbance at the onset of the attack, and also from the blood undergoing no alteration until a later period of the disease. Whatever the morbid influence may be, it produces an irritation, or more probably a peculiar inflammation, of a subacute character, which gradually extends to the stomach. Its first effect is to stimulate the large intestines to the expulsion of their contents, and this is succeeded by that of the duodenum, which I conceive to be indicated by the change of colour in the evacuations; the flow of bile being suppressed, the stomach also is now affected, and vomiting ensues; assimilation no longer goes on, while the morbid action of the mucous surface of the whole alimentary canal goes on increasing, and when its contents are wholly expelled, the more fluid portion of the blood itself is poured out. The blood no longer circulates through the lungs in sufficient quantity to keep up the animal heat, by obtaining its due supply of oxygen; and all the organs of the body suspend their functions, from being deprived of their usual supply of blood. Hence the suppression of urine and of bile, the intense thirst, and husky voice, from the want of saliva, and the secretions appropriated to the organs of voice, the body itself shrinks from being deprived of its fluids, and assumes a leaden hue from the little carbonized blood left stagnant in its vessels.

In consonance with this view of the disease, the indications are, to allay irritation in the bowels, restrain their inordinate action, and, as far as may be practicable, preserve the balance of circulation. In the first stage of diarrhœa, little difficulty is generally experienced. The *Mistura Cretæ cum Tinct. Opii*, a pill at bed-time, containing blue pill and opium, and castor oil in the morning, together with farinaceous diet, will in most instances arrest its progress.

When, however, the evacuations have become pale-coloured, and vomitting has set in, something more becomes necessary. I is then necessary to keep the patient in bed, administering every two or three hours a pill, containing a grain of calomel and a minute dose of opium, and effervescing draughts will assist in allaying the vomiting. No aperient, however mild, should be given when the diarrhœa is fairly checked. The calomel will act upon the liver, and the first flow of bile will produce a motion. The diet should consist throughout of thin sago, arrow-root, or similar food.

In the stage of rice-water dejections, which, properly speaking, is the first stage in which we can with certainty pronounce the disease cholera, I have tried nearly all the plans which have at various times been brought forward as successful, and I cannot say that I was satisfied with the result of any one remedy. A small proportion of my patients recovered, it is true; but it always remained a matter of doubt upon my mind, how far the means employed were conducive to that end; and I naturally considered what remedy was most likely to exert a control over a discharge which was evidently draining the system of the fluid necessary to carry on the functions of life; and, considering the case as one of passive hemorrhage, I at once decided upon trying the sulphuric acid, from its well known powers of coagulating albumen, as well as acting as an astringent in closing the relaxed mouths of the exhalents. The first case in which I tried it, after the first dose the stools changed their character, being a mass of coagulated albumen; after the third dose the purging ceased, and at the end of fourteen hours the patient passed a feculent motion mixed with albuminous flakes, and the patient recovered without experiencing any check. I have not detailed the case more fully, as it appeared at the time in the London Medical Gazette. Since then I have only had an opportunity of trying it in two cases, in both of which it arrested the rice-water dejections in a precisely similar manner, leaving no doubt as to the effect being produced by the acid. One of the last mentioned patients had a second attack of rice-water purging when in a state of convalescence, from committing an error in diet. He was in fact a confirmed sot. The complaint was a second time arrested by the acid, but the man died a month afterwards, his digestive organs being destroyed by his long-continued habits of intemperance. The form in which I have hitherto exhibited the acid is the following.

℞. *Infus. Caryoph.* ℥vi.; *Acid. Sulph. dil.* ʒii.; *Tinct. Opii.* gtt. xxx; *Sacc. Pur.* ʒss. M. *Cap.* ʒi. 6 *m. hor.* and at longer intervals when the purging is restrained.

The remainder of the treatment consisted in keeping the patient with the head low; the sago and arrow root to be taken only lukewarm, the room to be kept cool, and the quantity of bed-clothes to be regulated by the feelings of the patient. I am not sanguine enough to imagine that the result will be equally satisfactory in every case in which the acid may be tried, or even in the larger proportion of them; for medical men are often not called in until the circulating mass is so diminished in quantity, and so changed in quality, as to be no longer fit to carry on the functions of life.

North Shields, 6th November 1834.

ART. IX.—*Case of Hydrocephalus in which the fluid was withdrawn by operation.*

By SOMERVILLE S. ALISON, M. D.

ON the 23d June 1834, I was requested to visit Robert Cunningham, aged 5 months, son of a fisherman residing in Prestonpans. He had from the period of his birth inclined his head to a side, but appeared in perfect health in other respects, till about three months ago, when it was observed that his head was swollen, and more especially at certain spots; that he was affected with restlessness, frequent fits of crying, rolling of the eyes, cough and emaciation.

The head, properly so called, is of enormous size, and sinks the small and emaciated face into striking insignificance. Its circumference is 20½ inches, and a line drawn from ear to ear measures 12½ inches. The parietal bones are far asunder, and between them on pressing, a sensation is felt as of water under the scalp, and the right side of the forehead is more prominent than the left.

The eyes appear to project more than usual; part of the sclerotic tunic of the upper surface of the balls is constantly visible, and the pupils are quite sensible to light. He takes little food, is almost constantly awake, and, from the increasing emaciation, and from the present rapid progress of the disease, it is obvious that death must soon be the result unless it be speedily checked.

To prevent all misapprehension, it may be mentioned, that fits, vomiting, and other symptoms that often attend *hydrocephalus* have at no period been observed.

Calomel and compound powder of jalap have been ordered in small doses; and the propriety of withdrawing the fluid by an operation has been suggested to the parents, as the only measure in the present state of medicine that affords any chance of recovery.

24th. Bowels are open, and he appears altogether more at ease than for some time previous. Medicine to be continued.

26th. This day about 1 P. M. in presence of my partner, Mr Cunningham, surgeon in Ormiston, and the friends of the child, the head was again measured, and found to correspond with the dimensions formerly given. The point of a small cylindrical trocar was then rested on the right side of the anterior fontanelle, and gently introduced into the cavity of the head, in a direction obliquely forward and outward. When the trocar had penetrated about half an inch, water appeared at the canula, and the stilette was withdrawn, to give egress to the fluid, which immediately ran off in a stream with considerable force and rapidity. As the fluid escaped, the bones sunk under the hands, and the scalp, before tense, became loose and folded upon itself. The fluid was still flowing, though with less rapidity, when it was deemed prudent to close the wound, lest any bad effects should follow the sudden diminution of pressure on the brain. Adhesive plaster was applied over the wound, and the bones and scalp were retained firmly in their situation by a bandage and cap.

During the operation he did not cry much more than usual. He was laid in his cradle ; quiet was enjoined ; cow's milk diluted with water was ordered to constitute his diet; and wine and other spirituous liquors were prohibited.

10 P. M. He is reported to have been restless, and to have vomited a little, but he is free from fever, and has not been affected with fits and startings. Upon wine being again prohibited, occasion was taken to inquire if any had been given, when it was acknowledged by the mother that a small quantity had been administered "out of a cup" because, she added, he appeared faint.

27th. Since last report he has not been more restless than before the operation, and has not vomited, although a disposition to it has been observed. The eyes move freely, are certainly less prominent than before, and less of the sclerotic tunic is observable. The pulse is natural; the pupils sensible; the bowels are open, and the secretion of urine natural.

Upon measuring the fluid taken from the head, it amounted to nine ounces, two drachms, fluid measure, and, adding to that for what was lost during the operation, and what issued from the wound shortly afterwards, two ounces, which appears a moderate allowance, the whole fluid evacuated may be estimated at eleven ounces. The fluid is transparent and almost colourless, having only a slight green tint, scarcely observable.

28th, noon. He has been very quiet since last report, and has slept three hours during the night, a longer period of uninterrupted sleep than he has enjoyed since the commencement of the complaint. The eyes are bright, active, and sensible to light, pulse 120; skin cool and tongue moist; he has had three natural evacuations from the bowels; has taken greedily some milk and water; and coughs little. The bandages and pillows are wet with fluid which has issued from the wound, the amount of which it is difficult to specify; but five ounces must be a moderate computation. The head is much smaller than before the operation, and is very uneven on the surface with the folding of the scalp. Its dimensions were taken, but are lost.

29th. noon. At an early hour this morning he became very restless, vomited, cried much, and was affected with rigidity of one of the arms. The pulse is strong, and about 140; the tongue white and dry, and frequently protruded beyond the lips; and bowels continue open; swallows milk and water greedily, and sucks the nipple occasionally. No more water has issued from the head, and its dimensions are as follow,—circumference of head, 18 inches; from ear to ear over the crown of head, 11¼ inches. The eyes move incessantly in the orbit, and the pupils are very sensible. A leech to be applied to the temple, and a blister to the *occiput*.

8 P. M. He continued very restless, tossed his arms and legs, and the tongue was protruded at short intervals till about 6 o'clock, when he became quiet. The eyes are less active, and the pupils contract upon exposure to the light; the pulse considerably quicker than at noon, and the bowels continue open.

30th. Soon after last report he again became restless; while the limbs were convulsed, and the tongue protruded. These symptoms continued to recur at short intervals till 4. A. M, when death took place.

July 1st. This day, in presence of my partner Mr Cunningham, the head was examined. It appeared about the same size as when last measured, and the same feeling of fluctuation, that was experienced previous to the operation, was again felt. Previous to exposing the brain to view, an opening was made through the anterior *fontanelle* with the point of a scalpel, through which there immediately issued about ten ounces of fluid slightly tinged with blood. No trace of inflammatory action could be detected on the scalp in the vicinity of the wound, nor at the corresponding parts of the brain and its membranes. In the lateral ventricle of the right side was found a small quantity, —about half an ounce of a white opaque fluid, and in the left fully more, and of a colour inclining to yellow, and altogether much resembling a mixture of purulent fluid and water, with albuminous flakes. The walls of the lateral ventricles were rather unusually soft, but, on the whole, did not present marks of great disorganization. The base of the brain presented no appreciable signs of disease, and the nerves proceeding therefrom appeared perfectly sound.

Feeling satisfied that my treatment of this case was justified by its circumstances, and that it was proper to make an attempt for the life of the patient, I publish the details to give a practical demonstration of my belief in the opinion, that it is not from the knowledge of successful events only, but also of the unsuccessful, that a right estimate is to be obtained of the value of our measures.

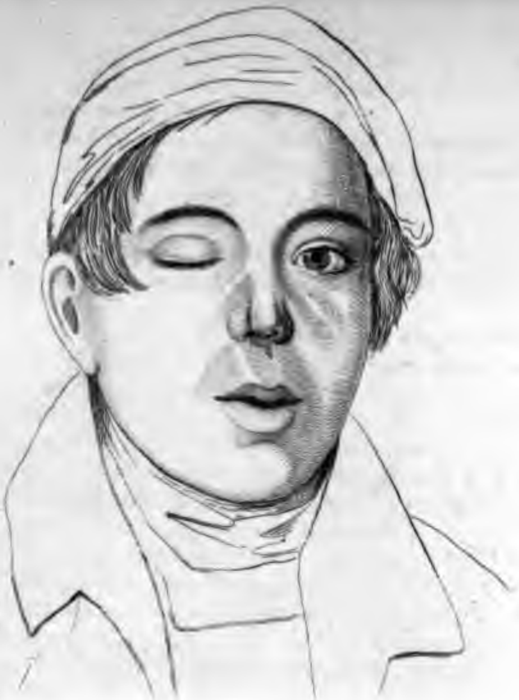
The operation was undertaken under the impression that the fluid was exterior to the brain; that the lateral ventricles were free from water; and that their walls, and, indeed, the whole cerebral mass, were very little, if at all, disorganized;—an opinion substantiated by the state of the parts on examination after death. It is in such a case, and in such only, that the evacuation of the fluid seems calculated to afford any chance of cure, and in which, therefore, it would be prudent to practise it. When there is merely a collection of fluid on the exterior of the brain, it appears as likely that recovery would follow its removal, as the evacuation of the water in the forms of hydrothorax, unconnected with organic disease, were it not for the greater delicacy and importance of the structures affected by the operation.

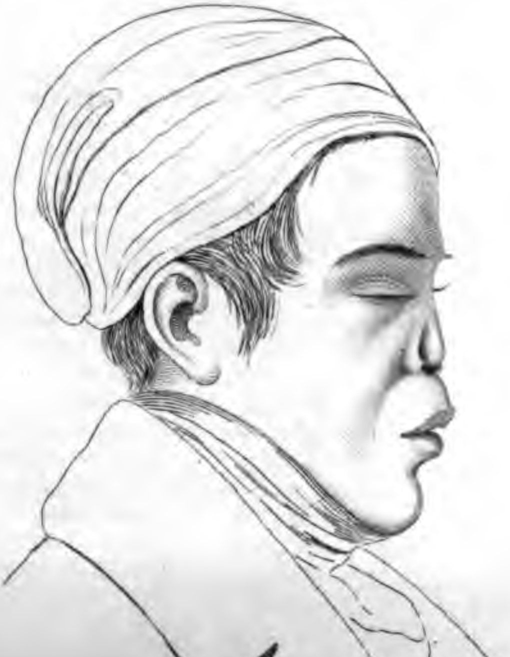
Anasarca is sometimes the effect of a derangement of the functions of the vascular system, totally unconnected with any organic lesion; and it will perhaps be allowed, that at least some cases of external *hydrocephalus* also owe their origin to functional derangement of the vascular system of the membranes covering the brain. Since such forms of anasarca are often cured, there is good reason to believe that the said forms of *hydrocephalus* might be as often cured, were it not for the danger of the operation necessary for the evacuation of the fluid in the meantime. The correction of the fault of the vascular system to which anasarca owes its origin, prevents the further effusion of fluid in the cellular tissue; and may not the same correction prevent a further effusion from the membranous coverings of the brain?

The principal danger to be apprehended from the operation is inflammation of the brain and its coverings. Yet I am not aware that it has existed in the majority of those cases in which death has followed this measure; and it is known, that at least two patients have ultimately survived its performance, one of which was treated by Dr Conquest of London, and the other by Mr Russell of Aberdeen.

Edin^r Med & Surg. Journ. Mr FERGUSSON'S CASE Plate III. p. 363 Vol

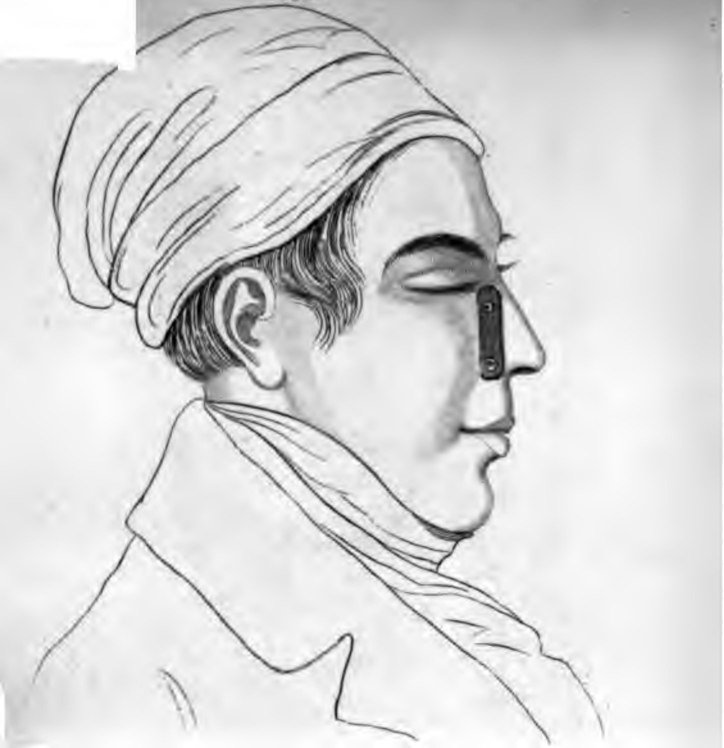
Fig. 1.

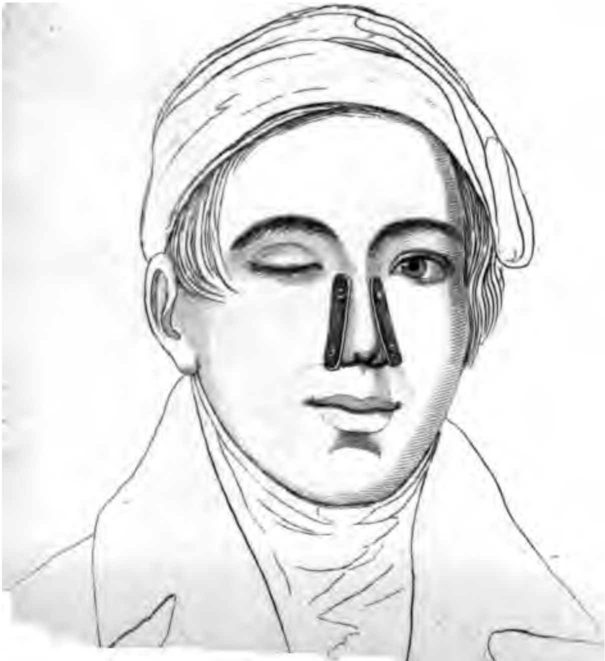




Mr FERGUSSON'S CASE. Plate II. p. 363 & 364.

Fig. 2.

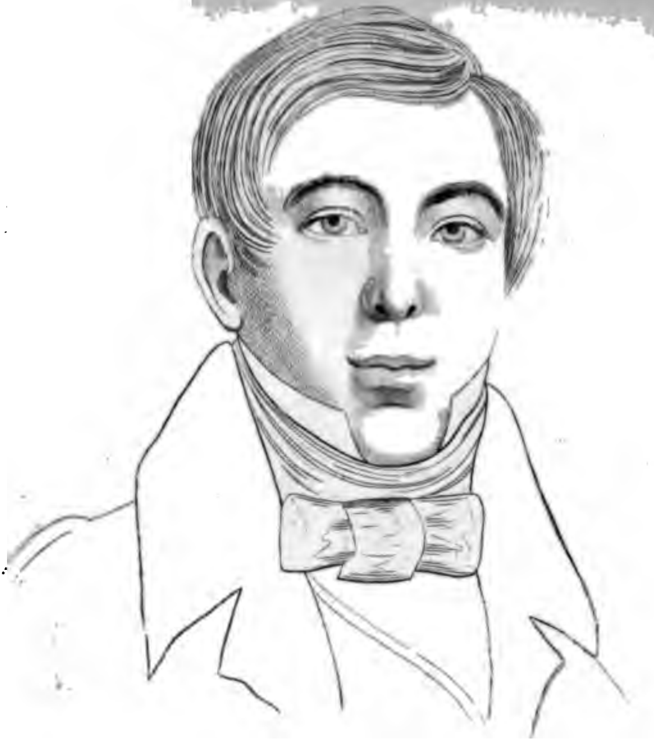


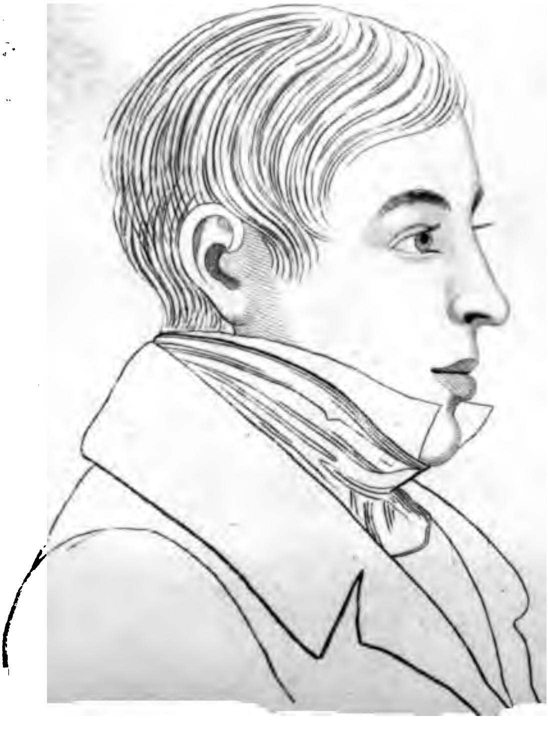


W. FERGUSSON'S CASE

Plate V. p. 363 [illegible]

Fig. 3.





That such inflammation was the cause of death in this case, I admit, from consideration of the symptoms shortly before dissolution, and from the appearance of fluid with albuminous flakes in the lateral ventricles, along with a slight softening of their walls, observed at the examination. But to conclude, from its supervention in any particular case, that the operation should never be performed, is not less unwarrantable than to infer, that, because *phlebitis*, *peritonitis*, and *phrenitis* sometimes follow the operations of bleeding, lithotomy, and trepanning the *cranium*, these operations should be discontinued.

ART. X.—*Case of Reparation of the Nose.* By WILLIAM FERGUSSON, Fellow the Royal College of Surgeons, and Lecturer on Surgery, Edinburgh.

A gentleman, aged 29, was left, after severe ulceration in the soft palate and nasal passages, in the state represented in Plate I. A large portion of the *vomer* was discharged during the ulceration; and, when the surface healed, the *columna* and *septum* were completely destroyed, and the nose was sunk on a level with the rest of the face, as seen in the figures in the plate referred to.

I have effected a most beneficial change in the appearance of this person, as will be seen in Plate III. which exhibits his portrait and profile, taken some time after the performance of the following operation.

I introduced a scalpel into the opening in the nose, and dissected the sunken *alæ* from their attachments underneath; I then raised the cheeks for more than half an inch from the surface of each upper maxillary bone, and cut to such an extent as to allow me, when I introduced my finger under the nose, to raise and put it into a shape somewhat like the original. I then passed two silver needles armed with steel points, and provided with small round heads, from the left cheek to the right, under the nose, and through those parts which had been dissected from the bones. By means of two pieces of firm leather, two inches long by one-half broad, through which the pins were also passed, I was enabled, on twisting the extremity of each pin spirally, after having cut off the steel points, to bring the cheeks near to one another, and in this way to cause the nose to become prominent. The sketches in Plate II. were taken some days after the swelling occasioned by the inflammation had subsided. On the eleventh day from the operation, I withdrew the pins, and introduced two others at different points from those first used; and, in eight days more, on these being removed, the nose stood quite prominent. For some days after the first operation, cloths dipt in cold water were applied constantly to keep down the inflammation; and, from time to time, the nasal passage was cleaned out with a small syringe. After the removal of the pins, lotions of the sulphate of zinc and copper were used alternately, and the sore soon healed. Two months after the first operation, I formed the *columna* from the upper lip, after the manner practised by Mr Liston; and, after several cuttings and pairings of small extent, the nose is now of the appearance represented in Plate III. The countenance is also much improved by the addition of an artificial eye, which has been fitted in in room of the original, which was destroyed some years ago by an attack of purulent *ophthalmia.*

The idea of this operation was first suggested to me on reading my friend Mr Bushnan's translation of the work of Dieffenbach on the Reparation of the Nose.* The operation which I have described differs, however, in many respects from that recommended by this distinguished surgeon, though the main feature is the same, viz. that of bringing the cheeks together so as to support the raised nose and keep it prominent. Dieffenbach slits the sunken nose into three portions, a central and two lateral; he then raises the cut margins of the cheeks for a quarter of an inch, and, after pairing the various margins, so as to make them fit like the stones of an arch, and stitching them together, carries the two needles across the face, so as to raise the nose, as represented in Plate II. I conceived it better in the case which I have related, to leave the outer part of the nose entire, and the result has come up to my most sanguine expectations. The organ is now as prominent, and nearly as firm, as in its original state; and the pain and danger attending the operation, as described by Dieffenbach, were in a great degree avoided. The *columna* is thicker, and the apertures are smaller, than I could have wished. When I put in the *columna*, the apex of the nose was a good deal contracted, and I purposely cut a thick portion from the lip, in order to keep the point full. This answered the purpose; but were I to perform such an operation again, with the nose in a similar state, I would prefer taking a narrower portion from the lip, and slitting that part of it about to be attached to the nose into two portions. By separating these I would gain my object; and, at the same time, by leaving the *columna* smaller, increase the nasal apertures.

I am induced to make the above operation public, as, in so far as I know, it is novel in this country; and appears to me more frequently applicable than the Indian operation, at present in general use for the reparation of the nose.

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* Surgical Observations on the Restoration of the Nose, &c. Translated from the German of Dr Dieffenbach, by J. S. Bushnan. London, 1833.

Edinburgh, 6, *Drummond Place,*
November 1834.

PART II.

CRITICAL ANALYSIS.

Art. I.—*Animal and Vegetable Physiology, considered with reference to Natural Theology.* By Peter Mark Roget, M. D. Secretary to the Royal Society, &c. London, 1834. Two Volumes 8vo. Second Edition.

At a very early period of the history of civilization and literature, the minds of the reflective part of society appear to have been forcibly directed to the consideration of the original Cause of the material world and its living inhabitants, to the study of the mutual adaptation of its multiplied constituent parts, and to the discovery of general principles of design and contrivance evinced in its periodical and incessant changes. Egypt, the cradle of ancient learning, was the first place, so far as historical records testify, in which the questions relating to these important but obscure subjects assumed a systematic shape; and there they very soon gave birth to a cumbrous and complicated system of Theosophy, in which the general desire to trace every operation in the material world, and in the frames of its living inhabitants, to a superior power, was principally evinced in the practice of ascribing divine attributes to the firmament, the celestial bodies, individuals who had distinguished themselves as benefactors, or by introducing useful arts, the elements, and several of the most useful or the most powerful and formidable of the lower animals. Though the superstitious practices thus engendered were the indications of the grossest ignorance, and of fancy entirely uncontrolled by reason or observation,—yet, inculcated and disseminated as they were, by the Egyptian priesthood, they continued long to exercise a mighty influence upon the civilized world of antiquity; and to them the antiquarian traces many of the peculiarities of the Greek Theosophy and philosophy, and a large proportion of that system of mythological tradition, which at once embellishes and mystifies some of the most beautiful productions of ancient genius. It is a historical fact, that the more opulent and curious of the Greeks invariably repaired to Egypt, either for information, or to complete those studies which they begun in their native country; and it is well established that the most eminent of their teachers, from Orpheus, Thales, and Pythagoras, to Plato, Democritus, and Aristotle, did not disdain to adopt the doctrines and learning of the Coptic priests, and to explain or modify these for the use of their countrymen.

In this manner it is impossible to doubt that many of the doctrines of the Greek philosophers upon the origin of the material world, and the laws by which its motions are regulated, upon the existence and nature of beings more powerful and intelligent than the human race, and upon the share which they took in human affairs, were derived in various degrees of purity and regularity from their Egyptian instructors. The doctrine of good and evil principles—*Cneph*, and *Typhon* or *Ahriman*,—prevalent in different degrees in the world, the doctrine of the overruling power of beings more powerful and intelligent than mankind, that of the immortality of the soul, and that of future rewards and punishments, were in this manner imported from Egypt into the Grecian schools.

From the many different individuals, however, by which these doctrines were communicated to the Greeks, and from the different channels through which they were made to flow, they were often very contradictory, and adulterated with a large proportion of marvellous, false, and inconsistent traditions. The first attempt to collect these into a system, and give them an intelligible and instructive shape, was made by Hesiod about 900 years before the birth of Jesus Christ, or 240 years before the commencement of the first Olympiad. The Theogony, though a narrative of the genealogy of the individuals worshipped as divinities, in many respects tedious, was evidently intended as an introduction to a more complete account of the influence exercised by the divinities over human affairs, and the material world general and particular; and we find in many parts of the Works and Days, distinct proofs of the confidence with which he believed in the superintending power of beings above the human, and in the adaptation of means to the accomplishment of ends. In proof of this, it is only requisite to remind the classical reader of the pointed and useful moral conveyed in the story of Pandora, the episodes of the golden, the silver, the brazen, and the iron ages, and in the concluding soliloquy, the wise moral advices given to his brother Perses, to guide him in his intercourse with the world, and the strong injunction to observe religious and moral duties, and pay respect and veneration to the divinities.

The attempt of Hesiod was comparatively rude and unpolished; and it was long before philosophy was sufficiently advanced to give birth to a purer and more natural system of Theosophy. The great difficulty, indeed, arose from the incapacity of unaided human reason to divest itself of the gross prejudices in favour of material views and mechanical explanations of all phenomena, moral and physical, in consequence of which even the most enlightened of the ancients were led to ascribe to immaterial existences the appetites and passions which they observed to belong to the animal body. The absurdities and inconsistencies thus introduced into the ancient pagan theology made many question the existence of such divinities as Hesiod and his followers described, and, certainly not without reason, made them regard the whole of the traditions given by these authors as entirely fabulous and incredible.

These attempts on the part of sceptics and disbelievers awakened the energy and ingenuity of several distinguished philosophers to discover, in the construction of the universe, and the laws by which its motions are regulated, the proofs of the existence of Divine agency; and we know from the best authorities of antiquity, that this subject occupied a large share of the instructions of Thales the Milesian, and his less celebrated successors Anaximander, Anaximenes, and Anaxagoras. All these philosophers, however, appear to have continued the error of ascribing divinity to material and destructible objects,—a mistake even not avoided by Pythagoras and his pupil, Alcmaeon of Crotona. Of all these philosophers, and several others of the same character, no writings are extant, and we learn their doctrines chiefly from the testimony of Cicero.

Among those philosophers who studied to establish in this manner the first and simplest principles of Natural Theology, Socrates is entitled to the most distinguished place, whether we consider the conclusiveness of the reasoning which he employed, or the pure and noble ideas which he had formed of the attributes of the Supreme Being. As the absurd and often incongruous ideas, to which the poetical mythology had given rise, had led many to doubt the existence of the Gods as thus represented, Socrates studied first to remove this erroneous notion, by referring to the proofs of design and contrivance evinced, not only in the construction and maintenance of the world, but in the structure and uses of the bodies of men and animals. Xenophon in the *Memorabilia*, records the mode of interrogative investigation, by which he led Aristodemus, one of these sceptics, to renounce his unbelief, and to acknowledge that the construction of the human body must be the masterpiece of some great Artificer, presenting innumerable marks of the love and favour of him by whom it was created. The conclusion of his reasoning and address to Aristodemus is very characteristic, and shows the just and elevated views that this most intelligent of pagan philosophers had formed on the nature, wisdom, and power of the Supreme Being. ʽΓνωσῃ το θειον οτι τοσουτον και τοιουτον εστιν, ωσθ ἁμα παντα ὁραν, και παντα ακουειν, και πανταχου παρειναι, και ἁμα παντων επιμελεισθαι αυτους.[*]

In a subsequent part of the same Treatise, Xenophon represents Socrates as reasoning with Euthydemus, a young person, ignorant and averse to all philosophical inquiry;—to prove to him, not only the great care and providence of the Divinity in arranging the objects of the material world for contributing to the great end of the growth and maintenance of its living inhabitants, but also the admirable manner in which the vicissitudes of the seasons tend to favour the growth of plants, and to furnish nutriment for animals,—all for the benefit and comfort of the human race. Upon which Euthydemus at length admits. Παντaπασιν ἐοικασιν, ω Σωκρατες, ὁι θεοι πολλην των ανθρωπων ἐπιμελειαν ποιεισθαι. "Assuredly, Socrates, the Divinities, appear to take the deepest interest in the welfare of mankind."[†]

It must, indeed, be regarded as a singular example either of anticipation or coincidence, that Socrates employs, when speaking of the duties due by mankind to the Supreme Being, very nearly the same thoughts and expressions which St Paul used long after in his Epistle to the Romans. "For the other divinities who confer on us benefits, bestow none of them openly; and He, who has created and sustains the whole world, in which all is good and beautiful, and which supplies with unerring accuracy to the creatures using its productions, every thing unaffected by decay, disease or age, is recognized performing the greatest duties, yet, in the government of the universe, is to us invisible. * * Even the ministers of the Gods you will find to be invisible. For the thunder, though evidently descending from above, and subduing whatever it encounters, is neither in approach, collision, nor departure, visible; nor are the winds discernible, however manifest be their effects. And the human soul, also, which partakes of the divine nature, and whose sovereign influence is evident, is itself invisible. Considering these things, therefore, Euthydemus, it is a duty not to neglect those things which are invisible, but, estimating their power from what is visible, to honour the divinity."[‡]

That arguments thus strongly and clearly stated did not make a more deep and durable impression upon the sceptics of antiquity, is probably to be ascribed to the fact, that Socrates neither published his instructions during his life, nor left them for this purpose after death, and that it was by means of the affectionate solicitude of Xenophon that these valuable doctrines have been entirely rescued from oblivion.

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[*] Memorabilia, lib. i. iv.

[†] Ibid. lib. iv. 3.

Ibid. 4

In the meantime, however, another pupil of the Athenian philosopher had undertaken the investigation of this obscure subject; and had he followed more closely the footsteps of his instructor, he might perhaps have exhibited a still more valuable specimen of natural theology than he has done. It was, however, an unfortunate circumstance, that the genius of Plato led him to prefer to the simple and patient method of investigation enjoined by Socrates, the mystical doctrines of the Egyptian priests, and the wild and fanciful creations of Pythagoras on the origin and constitution of the world, and its animation by the Supreme Mind.

Among the philosophers of antiquity, nevertheless, Plato is the first who appears to have devoted to the subject of natural theology an express treatise, which is fortunately preserved. The *Timaeus* of this philosopher, so named from a Pythagorean friend, or instructor of Plato, was evidently written with the view of proving the wisdom and intelligence of the divinity, not only in constructing the universe, but in framing the bodies of man and the living inhabitants by which it is peopled. It would be idle, however, to suppose, that, powerful as was the genius of Plato, all the doctrines taught in that treatise were peculiar to him. There is the strongest reason to believe, both from internal evidence and the collateral circumstances of the history of philosophy, that Plato there expounds not his own doctrines only, but those which he had received from other teachers, and, among the rest, several dogmata and principles which had been imported from Egypt several centuries previously, and which were more or less current among the educated and superior ranks of Greek society.

That the primary object of this Dialogue is to prove the wisdom and power of the Divinity, is evident from the manner in which Timaeus himself states to Socrates and his friends the object of inquiry. "First, therefore," he begins, "we must, in my opinion, determine what is everlasting and is uncreated, and what is created and is not eternal. The former, being ever the same, is to be comprehended by intellect with reason; the latter, which is created and destroyed, and is essentially temporary, is to be estimated by perception without reason. Now, whatever is created, must be generated by some cause, as it is impossible for any thing to be created without a cause. * * * * We must first consider, therefore, whether the firmament or universe, or whatever other denomination the world receives, was eternal, and without commencement of existence, or was created, proceeding from some beginning. For it is at once visible, tangible, and material; and all such objects are recognized by sense; and objects cognizable by sense, and comprehensible by opinion with perception, appear in the process of creation to be created. Of that, however, which is created, we say, that it must have been created by some agent; and to discover the Maker and Parent of all this world is the difficult task; and when that Maker is discovered, it is impossible to announce him to all."

"Concerning him, again, it must be considered according to what model the Creator framed the universe,—whether according to no similar standard, or according to that already made. If, indeed, this world be beautiful, and the Creator good, it is evident that he had in view a model of eternal duration; but if the reverse, which it is profane even to imagine, he must have looked to a model already made. But it is evident to all that the model was eternal; for the world is at once the most beautiful of created objects, and the Creator is the best of causes."

In this passage, and in several subsequent paragraphs, it is evident that Plato represents Timaeus as studying to discover the existence and attributes of the great First Cause or Creator, (ὁΔημιουργοσ) from the phenomena of the universe regarded as the contrivance of his wisdom, and the work of his hands; and it is interesting to observe, that though he is often lost in a sort of confused admiration, and pauses at the immensity of the objects surveyed, he pursues the train of his meditation and reasonings, nevertheless, with great perseverance and conclusiveness.

He begins first with the motions of the celestial bodies, and shows, from the regularity with which they revolve, and give rise to the alternations of day and night, the seasons, and the solar and lunar divisions of time, that they must have been devised by infinite wisdom, and arranged by infinite power. He next proceeds to explain the creation and nature of the *Dæmones,* or subordinate divinities; and adopts here the traditional representations of the poets; and introduces then the sublime address of the Supreme Being to the Dæmones, in which he asserts his own everlasting existence and creative power, his resolution to render the Dæmones immortal, and to create, by their means, a race of beings of finite duration, and partaking in a slight degree of the immortal character.

This leads to a long and obscure disquisition upon the combination of the soul with the body, the appetites and passions with the reason and judgment, and in which the four elements are made to perform a conspicuous part. He then proceeds to explain the properties of various substances; and the manner in which they affect the senses of the human race,—treats of taste and the tongue, odours and smelling, and colours and vision. This is followed by a meditation on the seat of the internal sensations and pasions, which leads him to give his ideas on the structure and formation of the human body, and the various intentions with which each part was placed in its proper situation. In this, among other interesting remarks, he represents the Daemons as having placed the heart to be at once the origin of the veins (arteries) and the source of the blood circulating through all the members of the body; *την δε δη καρδιαν αμα τῶν φλεβων και πηγην του περιφερομενου κατα παντα τα μελη σφοδρῶς ἁιματος εις την δορυφορικην οικεσιν κατεστησαν.* The manifold convolutions of the intestines are to detain the aliment a sufficient time to nourish the body. Marrow the divinities created from the other parts; and the brain from it to contain the residual and mortal part of the soul. Bone, the divinities created from pure soft earth, moistened by marrow, indurated in the fire, immersed in water, and again tempered in fire. Timaeus then explains the nature of respiration and animal heat, and shows by what means they are mutually connected; and it is clear that here again he entertains a distinct conception of the blood flowing through the whole body, and thus distributing the nutrient materials. *'Οθεν του κατα το σωμα ρεοντος το χρωμα εσχεν ὁιαν οψιν διεληλυθαμεν ὁ καλουμεν ἁιμα, νομην σαρκων και ξυμπαντος του σωματος· ὁθεν ὑδρευομενα ἑκαστα πληροῖ την του κενουμενου βασιν.* This is followed by a discussion on the origin and nature of diseases of the body and mind, the evils of intemperance and licentious habits, the operation of medicines, and the overruling dominion of the soul, allotted as a daemon to each by the divinity; and the whole is concluded by an account of the creation of animals, according to the Pythagorean principles.

To understand thoroughly the nature and object of the *Timaeus* it should be studied not only with the short fragment entitled Timaeus the Locrian, or the Soul of the Universe, but with the dialogue named Critias, and with the elaborate dialogue on the Laws. It is unquestionably true that Plato has shown some inconsistency in representing the Divinity in certain passages to be the same with the universe, the sun, the stars, the earth, and the souls of men generally—a doctrine, as Cicero remarks, manifestly false and inconsistent with itself. But of this it may be said, that such were the inconsistencies into which the most ingenious thinkers of antiquity were involved, when left to the unaided light of human observation and reason. This is evidently the source of many of the obscure and mysterious passages in the psychological writings of Plato; and, with an anxious desire to connect his belief in the existence of a Supreme Being, with the constant operation of the power of that being for the benefit of mankind, Plato was unavoidably unable to give a consistent view of the whole, from ignorance of the true qualities of that Being.

With all its faults and defects, nevertheless, the Timaeus is one of the most beautiful and interesting relics of the Greek philosophy, and exhibits in a very happy light the efforts of a benevolent and cultivated mind in explaining the nature and extent of the power of Divine agency. Like the other writings of Plato, it has suffered much by erroneous and ignorant translation. The Latin translation of Marsilius Ficinus gives a most inadequate and false view of the reasonings and doctrines delivered in the original; and it is evident that the author, whatever pains he took to translate words, has taken none to transfuse the ideas. The English translation by Sydenham and Taylor has been very much commended as a most beautiful and faithful transcript of the original. But we feel compelled to say that it is entirely unworthy of this character. There is even some reason to believe, that the translator has on many occasions translated not from the Greek of Plato, but from the Latin of Ficinus.

Cicero testified his admiration of the merits of this production by translating it into Latin; but of this work all that is extant are a few fragments.

Though the Romans borrowed all their philosophy, and most of their literature, from the Greeks, neither the merits of the Socratic doctrines, nor the eloquence of Plato, found at first a ready reception among that warlike nation. It happened that, at the time at which the Romans began to give most attention to literature and philosophy, though there were many subordinate sects, the majority of the educated Greeks were attached to the school either of Epicurus or Zeno. The exposition of the system of the former by Lucretius tended to make it be generally adopted by the higher and more polished of the Romans; and it seems, from the indirect testimony of Cicero and Horace, to have become extremely popular previous to the accession and during the reign of Augustus.

The tendency of this system was in some degree the counterpart of the principles inculcated by Socrates and Plato. The Epicureans did not, indeed, deny the existence of some power or powers of transcendent wisdom and might; but they conceived that these beings neither created the world at first, nor superintended its laws afterwards; and they mantained that man and his concerns were infinitely too contemptible to occupy any place in the minds of the divinities. Though the Epicurean philosophers devoted great attention to all the branches of physical science, and were intimately acquainted with the harmony of the various parts of the universe, with the regularity of the laws by which its motions are regulated, and with the adaptation of various means to effect certain general purposes; all these phenomena they attributed to certain properties of matter, and they did not regard these circumstances as in any degree indicative of the power or contrivance, or benevolence of the Divinity. Of this singular inconsistency the most remarkable example is exhibited in the beautiful poem of Lucretius *De Rerum Natura*, in which, although the author takes a most extensive and detailed view of the facts then ascertained, and the doctrines then current in Natural History and Physics, he draws from them, nevertheless, the general conclusion, that all the most wonderful and stupendous phenomena of the natural world are effected entirely without the intervention of the divinities, whom he represents to lead a life of tranquillity and supreme beatitude, remote from all the turbulent commotions of the material and the moral world.

Of these ancient sceptics the favourite doctrine appears to have been, that the supreme height of human felicity was to possess a mind calm and unruffled by all emotion, admiration, or passion; to behold with the most perfect indifference, all the beauty, harmony and magnificence of the universe, all the vicissitudes of its seasons, all the variety and multiplicity of its productions, and all the happy adaptations of its arrangements; to be perfectly free from enthusiasm, and even not to cultivate the love of virtue with excessive fervour. These sentiments Horace has embodied in the commencement of the first epistle of the first book, as characteristic of the Epicureans of his day.* It is impossible to deny that the dissemination of such opinions was directly opposed to those maxims of self-denial, exertion, endurance, and patriotism by which Rome had risen to be mistress of the world. It is accordingly evident, that the favourable reception which the poem of Lucretius insured the Epicurean system among the Romans, had given rise to the belief that it might introduce principles of irreligion and immorality more rapidly and extensively than by the natural course of society would have otherwise been the case, and had led various public-spirited individuals, as Cato and Cicero, to use their utmost endeavours to stem the torrent, and resist the progress of a system which they conceived detrimental to the best interests of society.

Among the Romans, therefore, the cause of Natural Theology found a learned, eloquent, and zealous advocate in Cicero who, after a pretty accurate knowledge of all the doctrines advanced on both sides of the question by the Greek philosophers, undertook to explain to his countrymen the true grounds of the belief in the existence of the Gods, and their superintendence of the world and human affairs, as they were deduced from the appearances afforded in the material world, and in the structure of human society.

Of this treatise of the Roman orator, the valuable character is, that it exhibits the doctrines of all the principal philosophical schools of Greece upon natural theology; presents a sort of chronological history of the progress which this department of learning had made from the time of Plato to that of Cicero; and, by making each speaker defend with eloquence and spirit his own side of the question, adduces all the arguments which the observation and reflection of the most accomplished men had been able to collect in illustration of the question, during the lapse of 400 years.

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* Nil admirari prope res est una, Numici,
Solaque, quae possit facere et servare beatum.
Hunc solem, et stellas, et decedentia certis
Tempora momentis, sunt qui formidine nulla
Imbuti spectant. Quid censes munera terrae?
Quid maris extremos Arabas ditantis et Indos?
Horat. Epist. i.

The first book of this treatise exhibits the doctrines of the Epicureans regarding the nature, occupations, and functions of the Gods, stated by Velleius, who derides equally the Creator of Plato, the Providence of the Stoics, and the animated Universe of the Pythagoreans,—but to which a strong but temperate and satisfactory refutation is given by Cotta. The second book presents a view of the theosophical principles of the Stoics by Balbus, who takes a beautiful and interesting survey of the arguments deduced from astronomy, anatomy, physiology, and natural history, embracing the instincts of the animal creation, in favour of the existence, the wisdom, and the power of the Divinity. The third book contains the reply of Cotta against the theory of the Stoics, and a view, according to the principles of the Academies, of the facts and arguments which prove the existence and wisdom of the Divinity.

The treatise *De Natura Deorum* is, in short, an excellent compendium of the facts and doctrines taught by all the principal philosophers of antiquity, on the evidence in favour of the existence, power, wisdom, and benevolence of the Supreme Being; and, notwithstanding its necessary defects as to the state of the physical sciences, it contains many arguments which the more recent authors have not disdained to employ.

Our limits will not permit us to enumerate all the authors who, among the ancients, more or less directly endeavoured to uphold the true principles of natural theology. But it is requisite to say, that, often in the writings of Ovid and Virgil, are arguments deduced from the phenomena of the material world in proof of the power and wisdom of the Divinity; that many fine sentiments of this kind are scattered through the Seven Books of Seneca on Natural Inquiries; and that the treatise of Galen, *de Usu Partium*, contains many beautiful and apt illustrations of the perfect adaptation of means to ends, and the contrivance exhibited by the Divine Mind in the construction of the animal body.

Of the whole of these writers, one general observation may be made. As they were compelled to inquire into the powers and attributes of the Supreme Being by the unaided faculty of human reason alone, all their investigations and reasonings betray that uncertain and often unsteady progress,—that confused and contradictory mode of thinking,—that glimmering of reason, which must ever attend the inquiries of the human mind when not guided by the light of revelation. Even the earlier Christian writers, as Lactantius, found it difficult to treat this subject with the caution and delicacy which it required. It was only in modern times, when not only the true principles of revealed religion became better understood, but when science began to be cultivated with a desire to discover useful truths only, that the doctrines of natural religion began to assume a clear and intelligible form, and to promise to occupy its just rank among the branches of human knowledge.

Though there is no doubt that Natural Theology is under deep obligations to Bacon for tracing the exact limits within which her researches ought to be confined, and though the devout turn of mind possessed by such men as Hooke, Newton, and Halley, concurred powerfully with their discoveries to direct the attention of the reflecting part of the world to the evidences of design, wisdom, and power, evinced in the motions of the heavenly bodies, in the phenomena of the atmosphere, and in the construction of the universe at large, while the researches of Harvey, Tyson, Malpighi, Grew, and Collins, contributed to the same purpose many important facts disclosed by the anatomy of animals and plants;—yet it is chiefly to the energies of one individual, that the world owes the general and systematic application of the facts and discoveries of modern philosophy to the formation of a luminous and conclusive body of evidence on natural theology.

The Honourable Robert Boyle appears to have been one of those benevolent and happily constituted individuals, whom, from time to time, Heaven appears to employ as the active instrument, not only of extending the boundaries of human knowledge, and directing mankind in the true path of scientific inquiry, but of showing its application in improving the condition of mankind, implanting just notions of the relation between man and the Supreme Being, and cultivating a sense of rational religion, —remote equally from thoughtless atheism and scepticism on the one hand, and superstition and puritanical bigotry on the other. Endowed with a singular predilection for the study of experimental philosophy, and especially for certain departments of chemistry and physics, Mr Boyle also possessed a frame of mind so devout that it appears to have been impossible for him, in exploring the phenomena of the natural world, ever to forget the agency of their First Cause.

The period at which Mr Boyle lived was in some degree calculated to develope in the strongest and most useful form these qualities. The gloomy temper and illiberal prejudices of the puritans had denounced all human learning as vain and frivolous, and all scientific pursuits as useless, or impious or vicious; and they looked on the Royal Society, supported as it was by the king and the bishops, as little better than a set of learned infidels; and argued that the cultivation of human knowledge had a tendency to engender pride and confidence in the human faculties, and proportionate disregard to the Supreme Being. It was a singular misfortune, on the other hand, that the example of Charles and most of his adherents gave some grounds for the belief, that all the learning of the day was devoted to the cause of irreligion and immorality. Many pious individuals were thus led to the erroneous conclusion, that human learning and science were incompatible with religion and true Christianity; and all attempts to acquire knowledge by experimental means, or to cultivate any other study than controversial theology, were involved in the general and sweeping condemnation pronounced by these censorious and inexorable judges. These prejudices were the effects of ignorance. Had these conscientious foes of literature and science devoted attention to either, they would have learned that, the more intimately they knew the composition and structure of the universe, the more accurately they understood the causes of the motions of the heavenly bodies, of the phenomena of the atmosphere, and the nature of the functions and instincts of animals, they would have acquired more just and comprehensive ideas of the wisdom, the power, and benevolence of the Creator; and they would have arrived at the conclusion, that the most profound study of physics and physiology, instead of begetting atheism and irreligion, or vice and immorality, furnish the most remarkable and irresistible proofs of the wisdom and benevolence of the Almighty, and his attention to the interests of his creatures in the most minute details. They would have seen that ignorance and partial knowledge only are the source of impiety and profanity; and that nothing tends so powerfully to cherish feelings of rational devotion and religious habits as a perfect knowledge of the beauty, the regularity, and the magnificence of Nature.

To eradicate prejudices so detrimental to the true interests of mankind, Mr Boyle, with his characteristic benevolence and piety, had all along laboured, and exerted himself in the latter part of his life most unremittingly and with great and irresistible force of reasoning. Though Mr Boyle had in various preceding writings often taken occasion to demonstrate the utility of a knowledge of science in rectifying our religious notions, it was in 1688, in his *Disquisition on the Final Causes of Natural Things*, that he first entered on a formal.consideration of the most important parts of this inquiry. Two years after, viz. in 1690, to demonstrate the entire compatibility of the cultivation of science with the most pure and rational principles of religion, he published the first part of the *Christian Virtuoso*, and, at the same time, two appendices, in the first of which he made some reflections explanatory of *Articles* of *Faith above but not against Reason;* and in the second he proved, that greatness of mind is promoted by rational Christianity. Of this first part of the Christian Virtuoso, an appendix was found after his death, and published, along with the Second Part of the same treatise, in his Collected Works in 1745.

We mention thus particularly these writings of this eminent philosopher for the following reasons. In the *first* place, they form the first complete Treatise in the English language on the subject of Natural Theology; and, if taken together, they may be justly said to contain all the substantial facts and arguments furnished by the phenomena of the natural world, to evince not only the existence, but the infinite wisdom, the power, and the benevolence of the Creator towards his creatures. *Secondly*, In these writings, Mr Boyle has not only anticipated all the subsequent authors who have treated the subject, but he has left a sort of inexhaustible mine, from which all subsequent reasoners have most freely, and often without acknowledgment, derived their most valuable materials. In the *third* place, though the value of the disquisition on final causes may be known to those conversant in psychological inquiries,—and Mr Stewart has mentioned that treatise as containing the best and most satisfactory vindication of the study of that order of causes,—it appears to be by no means generally known, that the most pointed illustrations of the propriety and justice of this inquiry, are those which are employed, and which have been employed, by writers on natural theology.

But we have, in the *fourth* place, to observe, that it appears to have entirely escaped notice, that the second part of the *Christian Virtuoso*, which contains a complete arranged collection of all those facts, arguments, and illustrations which are best suited to enforce the leading principles of natural theology, has furnished the basis on which the subsequent treatises on natural theology have been founded. The merit of this performance is, indeed, very great; and at the present moment it may be confidently recommended as containing one of the strongest and clearest statements of the evidences in proof of the wisdom, the power, and beneficence of the Supreme Being, that has yet been adduced. The author had divided the whole subject into six propositions, of which the first only properly comes within the range of our present observations. This is, "that an experimental knowledge of God's wisdom, and other attributes discoverable in his visible works, is a great help to natural piety and devotion." The truth of this proposition the author then proceeds to establish by conclusions deduced from the following different sources. 1*st*, Of the order, substance, magnitude, distances, and motions of the stars, particularly the planets, primary and secondary; 2*d*, of the bodies denominated elementary, or what are now denominated imponderable substances; 3*d*, of the nature and properties of minerals; and 4*th*, of the structure of various classes and tribes of plants and animals.

It is manifest that the learned author, in the course of this inquiry, places the great force of his reasoning and induction, in the structure of the bodies of men and animals, and the adaptation of the different organs to their respective uses, as far as they had been discovered. And here it is impossible not to admire the extent of knowledge, the dexterity of application, and the general skill displayed in the management of the whole argument. After a general view of the human organization, he takes a survey of the structure of the eye and its appendages, and indicates the admirable manner in which its coats and humours are adapted to receive, refract, and concentrate the luminous rays; how precise, yet extensive and complex, are its motions; how perfectly it is protected from injury. He next considers the position and uses of the brain and spinal chord; and makes some very happy reflections upon the construction and arrangement of the locomotive organs; and sums up the whole with the comparison derived from the watch presented to the uncivilized barbarian, which Paley has with so much dexterity applied to the same purpose. The treatise is, indeed, imperfect, and in mere fragments, and the plan of the author was never fully completed. But it has, nevertheless, been the source from which Ray, Derham, and Paley have derived all their most valuable materials.

That the two former authors should have availed themselves largely of the labours and inquiries of Boyle, is neither wonderful nor discreditable. Both were his contemporaries,—members of the same scientific body, engaged in the same pursuits, often with the same objects in view. The first author also acknowledges the obligations under which he was to the Honourable Mr Boyle, not only generally, but in particular parts of his work; and though he manifestly is indebted to the latter for the manner in which he conducts the inquiry, and for the most powerful and conclusive arguments, he has the further merit of adducing numerous pointed illustrations and confirmations from Natural History, Zoology, Entomology, Botany, Anatomy, and Physiology, and of occasionally fortifying the force of particular trains of reasoning by additional proofs derived from More, Cudworth, or his own experience and reflection. Derham was for the years 1711 and 1712, the divine appointed to deliver the lectures instituted by the Honourable Mr Boyle, in order to establish the truth of the Christian religion against all unbelievers, speculative and practical; and it was natural enough that he should avail himself of the labours, and tread in the path of the ingenious and diligent founder, in the performance of a duty so useful. His Physico-Theology, accordingly, contains an immense number of beautiful and pertinent illustrations of the truth of the general principles which he undertook to explain and defend, and of the particular examples of the wisdom and power displayed in the construction of the globe, and of the bodies of men and animals, and of Providence in the perpetual preservation of them in a state fit for the performance of their various functions.

It has resulted, indeed, partly from the circumstance of the posthumous writings of Mr Boyle not being published till some time after his death, and partly from the great merit of the works of Ray and Derham in fulfilling, as far as was practicable, the objects expected, that these have become almost the only works ever read or referred to on the subject; and several other writers who have, either as lecturers on the foundation of Mr Boyle, or independently, published essays on the same subject, as Cockburn, More, Burnet, Bentley, and others, have been either much neglected, or have relapsed, after a little temporary attention, into the most perfect oblivion and obscurity. The works of Ray and Derham, on the contrary, continued for nearly a century to enjoy a high degree of popularity, being read by all classes and ranks, and being conceived even by the religious part of the community, to be highly favourable to the propagation and maintenance of virtue and religion. The practical and instructive form of these two works, indeed, addressed as they were to all general readers who had received a liberal education, contributed most effectually to render them extremely popular,—to the exclusion, if not neglect, of other works of the same tendency, but of a more speculative character,—as that, for example, of Cheyne. Indeed, whoever peruses the works of Ray and Derham must admit that the information communicated by these authors was judiciously selected, and well arranged for the purpose intended; and the zoological and physiological reader often pauses to reflect with admiration at the learning and diligence of the authors, and to wonder how accurately they understood the economy, especially of animal bodies. The work of Ray was the most popular; for it passed, in the course of thirty years, through eleven editions.

It comes not within the plan of this brief sketch to enumerate all the works in which, though not devoted expressly to the subject, the authors took occasion to apply the facts in proof of the wisdom and benevolence of the Almighty. But it would be improper to omit to observe, that Maclaurin, in his Account of

Newton's Discoveries, and White, in his Natural History of Selborne, applied their respective sciences in illustration of the subject of Natural Religion; and Beattie and Ferguson have supported the general principles with great acuteness and strength of reasoning.

The merits of the works of Ray and Derham are in no circumstance more clearly evinced than in the long interval which elapsed before another express treatise on the same subject appeared. The space of ninety years elapsed before Archdeacon Paley undertook to illustrate the evidence of the principles of Natural Religion, by arguments deduced from the structure of the material world, and its organized inhabitants; and, in so doing, the merit of originality was in a still greater degree diminished than it was in the days of Ray and Derham; and the difficulty of the task was in a certain sense augmented, in so far as great expectations must be entertained where an attempt to improve upon these models was implied. Paley produced, indeed, a work which presented for that time an excellent summary of the chief arguments derived from the construction of the universe, and the mechanism of the bodies of plants and animals. But it was a work in a much greater degree argumentative than was calculated to render it popular. The arguments, though fairly deduced and clearly stated, occupied too prominent a situation in the work, and there was perhaps a smaller number, or at least a less extensive collection of impressive facts and illustrations, than was requisite in a work calculated for the use of the general reader. In perusing the work of this pious and learned prelate, we feel that it requires a much greater degree of effort to follow his trains of reasoning than is proper in a Treatise on Natural Theology. The treatise of Paley, accordingly, has never been so generally perused as that of Ray; and, though it is well known to the educated part of society, it is less read than the work of Derham.

A more serious objection to the natural theology of Paley, or rather to its author, is, that, without in any part of his work acknowledging the originality of Boyle, he has borrowed very liberally from this author, both a great number of his arguments, and also many of his facts. Entire trains of reasoning, which appear to great advantage in Paley, are taken chiefly from the Christian Virtuoso of Mr Boyle. Was it possible that the learned Archdean could, in composing his work, have forgotten the sources from which he derived some of its most essential materials? or are we to imagine that he calculated upon the ignorance of readers, and thought that, as Boyle's treatise was little known, it was a gratuitous piece of candour to acknowledge the extent of his obligations? Loth, indeed, should we be to deprive so meritorious an author, and so excellent a person as

Paley evidently was, of the smallest portion of his just merit. But we feel that a large debt of gratitude is due by the world to Boyle for his manifold and indefatigable services in this cause; and, in allotting to each his respective share of merit, we must not forget to say, that, in this respect, full justice has never yet been rendered to the benevolent author of the *Essay on Final Causes*, and the *Christian Virtuoso.*

The work of Paley, nevertheless, able as it is, has been for some time considerably behind the progress of those branches of physical and physiological science, from which its most pregnant and important principles are deduced; and every one who is acquainted with the progress and present state of the various departments of zoology and phytology, must perceive, that, for more than twenty years, the English language possessed no work which could be specified as exhibiting a just view of the principles of natural theology correspondent with the advanced state of the physical and physiological sciences.

In the meantime, a most logical and beautiful examination into the principles of natural religion appeared by Mr Stewart, in the second volume of his Philosophy of the Active and Moral Powers of Man. The clearness with which all the divisions of the subject are successively examined,—the methodical manner in which each is made to illustrate the other,—and the comprehensive knowledge of the labours of previous philosophers with which Mr Stewart illustrates his inquiry, render this part of his work quite unrivalled as a treatise on natural religion.

The general bent of the observations of this eloquent philosopher may be understood from the following passage, which we think it requisite to adduce here, because it states more clearly, than we have anywhere seen it done, the exact object and reasons of human inquiry, in investigating the validity of the evidence for the belief in the existence of design, in the original construction and subsequent preservation of the universe and its inhabitants.

> " I have hitherto taken no notice of that curiosity we feel concerning the great Author of all the wonders we see around us. Few will dispute that it is natural and reasonable in man to inquire concerning his own origin and that of the various tribes of animals he sees continually rising into existence; concerning that power which put in motion the different parts of the material universe, and that wisdom which is the source of its order and beauty. Our inquiries on these subjects are essentially different, both in their nature and object, from all the others in which we can employ our faculties; and our disposition to engage in them affords a presumption in favour of a future state perfectly distinct from those that arise from our restless and insatiable curiosity about the objects of science; and a presumption, we may add, not liable to the same objections which might possibly be urged against some of the fore-

going reasonings. In our astronomical and physical researches, for example, our object is to ascertain the laws of nature; or, in other words, to discover and to classify facts; and consequently, our inquiries, though they lead us into a more extensive field, are precisely the same in kind with those which lay the foundation of the practical arts, and of our conduct in the common affairs of life. It might perhaps therefore be imagined that our curiosity concerning the distant parts of the universe, and the discoveries to which it has led, do not justify the conclusions I formerly deduced from them, as these discoveries are only to be regarded as the accidental and unavoidable result of principles which were implanted in our minds for very different purposes: That although the knowledge of many astronomical facts may not be subservient to our accommodation here, and although our faculties were not bestowed on us in order that we might be qualified for discovering them, yet that the same measure of curiosity and of genius which was necessary for the purposes of life, could not fail to bring also to light a variety of truths which do not admit of a practical application. But what shall we say of our curiosity concerning the Author of Nature, and the satisfaction we derive in contemplating the marks of power, wisdom, and goodness which are impressed on his works? To what purpose are we rendered capable of elevating our thoughts to him, if we are never to enjoy a clearer view of his nature and attributes, and of the manner in which he governs the material and the moral world? All that philosophy discovers to us with respect to the events which happen in either, and all that is useful for the purposes of human life to know, amounts only to this, that particular events are constantly conjoined together, so that when we see the one we may expect the other; but although we can discover no more, curiosity is not satisfied. Our constitution determines us to believe that every event requires an efficient cause, or implies the operation of power. And it is this principle of our nature which suggests the belief of a Deity. But how he operates, whether mediately or immediately, and how the connection between mind and matter is carried on, are questions which, although they must excite the curiosity of every man capable of reflection, we may venture to say will never be resolved by human genius. Wherever we direct our inquiries, whether to the anatomy and physiology of animals, to the growth of vegetables, to the chemical attractions and repulsions, or to the motions of the heavenly bodies, we perpetually perceive the effects of powers which cannot belong to mere matter. To a certain length we are able to proceed; but in every research we meet with an impassable line—a line which is marked with sufficient distinctness, and which no man now thinks of passing who has just views of the nature and object of philosophy. It was indeed by pointing it out that Bacon did so much service to science. But although the nature of these powers, and the mode of their operations, are not the objects of our knowledge at present, we are certain of their existence, and of their acting in subserviency to wise design. So much it was necessary for man to know, to lay a foundation for natural religion, and we can conceive no other purpose to which this knowledge is subservient. It was plainly intended, then, that man should have the idea of overruling power and wisdom: but to what end this idea if we are not to exist hereafter? And why is our curiosity so strong with respect to things beyond the limit of human inquiry, but to lead our thoughts forward to futurity? If it has not this effect on the mind, the contemplation of the infinite perfections of the Deity, and even a view of the magnificence of the material universe, could only serve to damp the ardour of human pursuits, and make the business of life appear unworthy of our regard. When we return from our excursions through the immensity of space and time to a view of ourselves and of the globe we inhabit, what a short span does human life appear, and how contemptible this boasted theatre of human ambition! 'Hoc est punctum quod inter tot gentes ferro et igni dividitur:—cum te in illa vere magna sustuleris, quoties videbis exercitus sub rectis ire vexillis, libebit dicere: it nigrum campis agmen; formicarum iste discursus est in angusto laborantium.'*

'O pudor! O stolidi præceps vesania voti!
Quantula pars rerum est, in qua se gloria jactat,
Ira fremit, metus exanimat, dolor urit, egestas
Cogit opes ferro, insidiis, flamma atque veneno
Cernitur, et trepido fervent humana tumultu.'†

"Such reflections can scarcely fail to force themselves on every mind which contrasts the field of its present exertions with those enlarged prospects of the universe which philosophy opens; and they are certainly reflections which neither contribute to make us happier in ourselves, nor more useful citizens. On the contrary, their tendency in both respects is so manifestly unfavourable, that it may be safely affirmed, that, if man had no intimations of a future existence, it would have been better for him never to have extended his views beyond this globe and the period of human life, instead of embracing, as at present, a stretch of duration and of space which throws a ridicule on the whole history of human affairs." ‡

It is impossible for any reflecting mind not to admit in the fullest extent the justice and conclusiveness of these observations on the circumstances which prompt man to inquire into the primary cause of his own existence, and into the intentions or purposes of those numerous and apparently complicated processes, which he observes perpetually going on in his own body, and in those of all other animated beings. The great difficulty in this inquiry is to know how to proceed, what exact line to pursue, and within what limits to confine our scrutiny; and this, indeed, must always be a difficulty, so long as physiology is an imperfect science. If we knew exactly the uses of every organ and every part of an organ, then the inquiries and reasonings of the natural theologian would be in this department easy and liable to no false or premature conclusion. But if the anatomist still demonstrates parts, for an account of the exact utility or office of which, he looks in vain to the physiologist, or receives in answer only a series of hypothetical and unfounded conjectures, it is manifest that such materials cannot be applied to the purposes of natural theology, or may be used to its detriment. Such has been the case with the spleen, an organ which has at one time been denominated a packing organ, and at another a make-weight, to counterbalance the weight of the liver.

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* Seneca.

† Buchan. de Sphæra, Lib. i. l. 678.

‡ Philosophy of the Active and Moral Powers of Man. By Dugald Stewart, Esq.

To such idle and absurd fancies, neither philosophy nor natural theology, such as deserves the name, will lend any countenance. To such applications it may be answered, that it is not from a single fact, or from *our* incapacity to understand the uses of an organ in one case, that we can justly draw any conclusion as to the general question. The whole subject must be surveyed in all its relations and bearings; the general proofs of design and intentional arrangement, when understood, should be carefully studied and contemplated; and those which we are unable to understand should be regarded as mere proofs of the incapacity of finite beings to comprehend all the purposes of infinite wisdom.

Mr Stewart, in a previous part of his work, and, indeed, Mr Locke long before Mr Stewart, had inculcated the necessity of conducting upon these principles our scrutiny into the proofs of design exhibited in the creation and preservation of the universe; and, with the view of exemplifying the mode of inquiry, Mr Stewart has not only traced with the hand of a master, its general outlines; but he has shown, especially from that valuable and almost inexhaustible store,—the facts furnished by comparative anatomy,—that it is practicable to infer the evidence of *design* from its effects,—particularly in the anatomico-physiological relations as they may be named, which Cuvier has shown to exist between remote organs, which, however, are physiologically allied; for instance the teeth, and hooves or claws with the stomach, the bones with the muscles, &c. But further, Mr Stewart gives a short but clear view of the wisdom and unity, or general conformity of this design, as evinced in the construction of the universe,—from the remote and apparently unconnected sources of astronomy and anatomy,—the physics of the heavens and the physiology of the animals of this globe. To Mr Stewart belongs the merit of pointing out the manner in which the principles of natural theology ought to be deduced from the facts of modern science, and erected into a general system on a comprehensive scale, suitable to the extensive range and advanced state of the physical and physiological sciences in the nineteenth century; and it only remained for some able and accomplished person to realize the design thus ably sketched. There is little reason to believe, however, that this important and useful object would have been soon carried into effect in a becoming manner, unless for the intervention of a circumstance presently to be noticed; and we cannot mention more than one publication on the subject since the appearance of the work of Mr Stewart. We allude to *Letters to a Young Naturalist on the Study of Nature and Natural Theology*, by Dr Drummond, Professor of Anatomy and Physiology in the Belfast Academical Institution, which was published at London in 1831. Though small in size, and without methodic arrangement, this little performance presents a happy selection from zoology, botany, conchology, and even morals and metaphysics, of interesting and important facts, in proof of harmony of arrangement, elegance and felicity in design, and accuracy of adaptation in the economy of the globe and its inhabitants.

It was a fortunate circumstance that, at this conjuncture, the late Right Honourable and Reverend Earl of Bridgewater had, with great munificence, allotted, by will of the 25th February 1825, a sum of L. 8000, with the dividends thereby accruing, to be held at the disposal of the President of the Royal Society for the time, and to be applied according to his judgment in remunerating a person or persons to be nominated by him to compose a work on the *Power, Wisdom, and Goodness of God, as manifested in the Creation*, not only of inorganic, but of organic beings, and in the whole economy of the universe, as ascertained by the investigations and discoveries of modern science.

This munificent bequest made good provision for the preparation of a most extensive and complete view of the principles of Natural Theology; and, accordingly, that the office might be performed in a manner agreeable to the views of the noble testator, different divisions of the subject were assigned to different competent individuals, already distinguished in the scientific world. The subject of Animal and Vegetable Physiology was assigned to Dr Roget; and we have now to consider the manner in which this author has performed his task, and the degree of success with which he has attained the great objects of applying the facts of the structure and actions of animals and plants to demonstrate the power, the wisdom, and the benevolence of the Supreme Being, and his title to the gratitude and adoration of his creatures, and to establish the truth of the great principles of Natural Religion.

Dr Roget begins his work with a statement of the object of inquiry; and, after some observations on the relation of our globe to the universe, of man to the globe, on the objects of human knowledge, on mechanical and chemical properties, and the peculiar phenomena of living bodies, he gives a short sketch of the ordinary course and duration of vital actions; and after stating that it is the province of physiology to ascertain the laws which regulate the phenomena of life, he introduces the proper business of his treatise by the following remarks on these laws, and on that class of them which he refers to the head of Final Causes.

"These peculiar laws, which it is the province of physiology to investigate, are, as I have before observed, of two kinds, each founded upon relations of a different class. The first, which depend upon the simple relation of cause and effect, are concerned merely with the natural powers of matter. They are the laws that regulate the succession of phenomena purely physical in all their stages. These phenomena consist in changes among material particles, which are either of a mechanical or chemical nature; or in the affections of imponderable physical agents, such as heat, light, electricity, and magnetism; and they include also the phenomena that take place in organized bodies, and which are referable to the operation of certain physical powers, appertaining to particular structures, such as muscular contraction and nervous irritation; phenomena which, as we shall afterwards find, are not reducible to any of the former laws, but are peculiar to the living state. The second class of laws comprise those which are founded on the relation of means to an end; and which are usually denominated *final causes.* They involve the operations of mind, in conjunction with those of matter. They presuppose intention or design; a supposition which implies intelligence, thought, motives, volition,—particular purposes to be answered, requiring the agency of powers and of instruments adapted to the production of the intended effects:—the knowledge of the properties of matter, the selection and choice of particular means, and the power of employing them in an effective manner. These purposes may themselves be subservient to more general objects, and these objects again subordinate to remoter ends; so that the whole shall comprehend a systematic plan of operations, conducive, on the most enlarged views, to ultimate and general utility."—Pp. 22, 23.

Then come the reasons for studying and discovering these Final Causes.

"The study of these final causes is, in some measure, forced upon our attention by even the most superficial survey of nature. It is impossible not to recognise the character of intention, which is so indelibly impressed upon every part of the structure both of vegetable and animal beings, and which marks the whole series of phenomena connected with their history. Microscopic observations teach us that the embryo of an organic being contains within itself the rudiments of the future vegetable or animal structure, into which it is gradually transformed by the slow and successive expansion and developement of all its parts. The processes of nutrition do nothing more than fill up the outlines already sketched on the living canvas. Every organ, nay every fibre, resulting from this developement, contributes its share in the production of certain definite effects which we constantly witness taking place around us, as well as experience in our own persons. But these effects, though so familiar to us, are not on that account the less involved in mystery, or the less replete with wonder. To say that they are the results of chance conveys no information ; and is equivalent to the assertion that they are wholly without a cause. Every one who is accustomed to reflect upon the operations of his own mind must feel that such a conclusion is contrary to the constitution of human thought ; for if we are to reason at all, we can reason only upon the principle that for every effect there must exist a corresponding cause ; or, in other words, that there is an established and invariable order of sequence among the changes which take place in the universe.

" But though it be granted that all the phenomena we behold are the effects of certain causes, it might still be alleged, as a bar to all further reasoning, that these causes are not only utterly unknown to us, but that their discovery is wholly beyond the reach of our faculties. The argument is specious only because it is true in one particular sense, and that a very limited one. Those who urge it, do not seem to be aware that its general application, in that very same sense, would shake the foundation of every kind of knowledge, even that which we regard as built upon the most solid basis. Of causation, it is agreed that we know nothing; all that we do know is, that one event succeeds another with undeviating constancy. Now, if we were to probe this subject to the bottom, we should find that, in rigid strictness, we have no certain knowledge of the existence of any thing, save that of the sensations and ideas which are actually passing in our minds, and of which we are necessarily conscious. Our belief in the existence of external objects, in their undergoing certain changes, and in their possessing certain physical properties, rests on a different foundation, namely, the evidence of our senses ; for it is the result of inferences which the mind is by the constitution of its frame necessarily led to form. We may trace to a similar origin the persuasion, irresistibly forced upon us, that there exist not only other material objects beside our own bodies, but also other intellectual beings beside ourselves. We can neither see nor feel those extraneous intellects, any more than we can see or feel the cause of gravitation or the subtle sources of electricity or magnetism. We nevertheless believe in the reality both of the one and of the other ; but it is only because we infer their existence from particular trains of impressions made upon our senses, of which impressions alone our knowledge can, in metaphysical strictness, be termed certain."—Pp. 23—26.

By a natural transition, Dr Roget proceeds to consider the kind of evidence for the existence of other beings similar to the individual I, and the consequent idea of the existence of a Being superior to all, and the general question of the presence of design in his works.

" Such is the kind of evidence on which rests our belief of the existence of our fellow men. Such, also, is the foundation of our assurance that there exists a mighty Intellect, who has planned and executed the stupendous works of creation, with a skill surpassing our utmost conceptions ; by powers to which we can assign no limit, and the object of whose will is universal good.

" It will argue no undue presumption, therefore, if, in our earnest endeavours to form just ideas of the attributes of the Deity from the examination of nature, we are led to institute comparisons between His works and those of man; and strive to gather some faint notions of the divine intelligence by applying the only standard of admeasurement which we possess, and are permitted to employ, namely, that derived from the operations of human intellect. Our interpretations of the designs of the Creator must here be obtained through the medium of human views ; and our judgment of His benevolence can be formed only by reference to our own affections, and by their accordance with those ardent aspirations after good, which the author of our being has deeply interwoven with our frame.

" The evidence of design and contrivance in the works of nature carries with it the greatest force whenever we can trace a coincidence between them and the products of human art. If in any unknown region of the earth we chanced to discover a piece of machinery, of which the purpose was manifest, we should not fail to ascribe it to the workmanship of some mechanist, possessed of intelligence, actuated by a motive, and guided by intention. Farther, if we had a previous experience of the operation of similar kinds of mechanism, we could not doubt that the effect we saw produced was the one intended by the artificer. Thus, if in an unexplored country, we saw, moving upon the waters of a lake, the trunk of a tree, carved into the shape of a boat, we should immediately conclude that this form had been given to it for the purpose of enabling it to float. If we found it also provided with paddles at its sides, we should infer from our previous knowledge of the effects of such instruments, that they were intended to give motion to this boat, and we should not hesitate to conclude that the whole was the work of human hands, and the product of human intelligence and design. If, in addition, we found this boat furnished with a rudder and with sails, we should at once understand the object of these contrivances, and our ideas of the skill of the artificer would rise in proportion to the excellence of the apparatus, and the ingenuity displayed in its adaptation to circumstances.

" Let us suppose that in another part of this lake we found an insect, shaped like the boat, and moving through the water by successive impulses given to that medium by the action of levers, extending from its sides, and shaped like paddles, having the same kind of movement, and producing the same effects. Could we resist the persuasion that the artificer of this insect, when forming it of this shape, and providing it with these paddles, had the same mechanical objects in view? Shall we not be confirmed in this idea on finding that these paddles are constructed with joints, that admit of no other motion than that of striking against the water, and of thus urging forwards the animal in its passage through that dense and resisting medium? Many aquatic animals are furnished with tails which evidently act as rudders, directing the course of their progressive motion through the fluid. Who can doubt but that the same intention and the same mechanical principles which guide the practice of the ship-builder, are here applied in a manner still more refined, and with a master's hand? If Nature has furnished the nautilus with an expansible membrane, which the animal is able to spread before the breeze, when propitious, and by means of which it is wafted along the surface of the sea, but which it quickly retracts in unfavourable circumstances, is not her design similar to that of the human artificer, when he equips his bark with sails, and provides the requisite machinery for their being hoisted or furled with ease and expedition?

"The maker of an hydraulic engine places valves in particular parts of its pipes and cisterns, with a view to prevent the retrograde motion of the fluids which are to pass through them. Can the valves of the veins, or of the lymphatics, or of the heart have a different object: and are they not the result of deliberate and express contrivance in the great Mechanist of the living frame?"—Pp. 27—31.

This is followed by a short view of the contrivance displayed in the structure of the eye as an optical instrument; after which the author concludes the first chapter with the following pertinent observations.

"The more we extend our knowledge of the operations of creative power, as manifested in the structure and economy of organized beings, the better we become qualified to appreciate the intentions with which the several arrangements and constructions have been devised, the art with which they have been accomplished, and the grand comprehensive plan of which they form a part. By knowing the general tendencies of analogous formations, we can sometimes recognize designs that are but faintly indicated, and trace the links which connect them with more general laws. By rendering ourselves familiar with the hand-writing where the characters are clearly legible, we gradually learn to decypher the more obscure passages, and are enabled to follow the continuity of the narrative through chapters that would otherwise appear mutilated and defaced. Hence the utility of comprehending in our studies the whole range of the organized creation, with a view to the discovery of final causes, and obtaining adequate ideas of the power, the wisdom, and the goodness of God."—Pp. 33—34.

Dr Roget then proceeds to take a short view of the actions and functions proper to living beings, and the structure requisite for the performance of these functions. The functions he distinguishes into nutritive or vital, and mechanical, and finishes by giving the following view of the nature of life.

> " Life, then, consists of a continued series of actions and reactions, ever varying, yet constantly tending to definite ends. Most of the parts of which the body consists undergo continual and progressive changes in their dimensions, figure, arrangement, and composition. The materials which have been united together and fashioned into the several organs, are themselves successively removed and replaced by others, which again are in their turn, discarded, and new materials substituted, though without any perceptible change of external form. Perpetual mutation appears to constitute the fundamental law of living nature: and it has been further decreed by the power which gave the first impulse of animation to this organized fabric, that its movements and its powers shall be limited in their duration, and that, even when they are not destroyed by extraneous causes, after continuing for a certain period, they shall come to a close. The law of Mortality, to which all the beings that have received the gift of life are subjected, is a necessary consequence of the law of mutation; and the same causes that originally effected the developement and growth of the system, and maintained it in the vigour of its maturity, by continuing to operate, are certain to lead to the demolition of the fabric they had raised, and to the exhaustion and final extinction of its powers. The individual dies; but it is only to give place to other beings, alike in nature and in form, equally partaking of the blessings of existence, and destined, after having in their turn, given rise to a new race of successors, to run through the same perpetual cycle of changes and renovations."—Pp. 42, 43.

Dr Roget then shows, that in all the successive series of the vegetable and animal tribes, the great object of the Creator has been to insure the perpetuity of the different races; or, in other words, indefinite production, both in plants and in animals. As it is manifest, however, that this process of indefinite production, within limits of definite extent, would at length overcrowd the space occupied, with a greater number of beings than could be properly maintained,—this inconvenience is obviated by the limits prescribed to the existence of individuals. This limited duration is in many instances natural and spontaneous; but in many more, especially in the case of animals, it is artificial, and the result of a system of instinctive hostility, or we should say, in less hypothetical language, a system of self-preservation, without reference to the detriment of others, carried on between different tribes of animals. The use of this, Dr Roget thinks, among other purposes, is to maintain a degree of balance betwixt the different races of animals, so that the numbers of one *genus* shall not predominate very much over those of others; and he hence deduces the existence of a law, to which he gives the name of the *law of variety*; or that according to which the *genera* of animals are continued different from each other, but always in conformity to the same type. After some further observations upon the regularity with which the type of each *genus* and family is observed, upon the correlation of different organs with each other, and upon the systematic regularity with which organs or classes of organs are modified from their original type in the different families and *genera*, he directs the attention of the reader to the successive transition of structure, from simplicity to complexity, as its rudimental form is exhibited in the different classes of vertebrated animals, and in their fœtal productions.

With regard to the method of arrangement adopted by Dr Roget, we beg to submit the following observations.

The great purpose of life, both in vegetable and animal bodies, may be justly said to be the continuation of the race or generic reproduction; and to this all the other functions, and especially that of individual reproduction or nutrition, are completely subservient. To this the structure and arrangements of all the organs, and the assemblage and succession of all the functions, have a reference more or less direct. If we take an extensive general survey of the vegetable and animal worlds, we perceive that both plants and animals grow, and are nourished until they attain a certain size, and until, with other marks of perfection, the organs of reproduction are fully developed; that *ova*, or the embryal rudiments of new living beings, are then detached from them; and that after this event many plants and animals die; and all undergo a temporary *inertia* of action, which, after several recurrences, terminates in the cessation of life.

It is evident, therefore, that the nutritious functions are subservient to the reproductive; and it is further evident, that the great purpose of all those functions of sensation and varied locomotion peculiar to animals, is to procure suitable materials of nutrition, or those necessary to the reproduction and maintenance of the individual. While the existence of individuals both in the vegetable and animal kingdom is limited in duration, that of the different races is perpetual.

The first and most impressive class of actions in living bodies which attracts the attention, is that of the various vital actions concurring to nutrition, and the mode of origin and termination; or, in other words, the faculty which living beings possess of appropriating to their own substance foreign materials. Plants and animals possess the common characters of origin by generation, growth by nutrition, and termination by death; and in the possession of these characters consists their difference from the inorganic objects of the material world generally.

For the performance of this important function, therefore, the Author of Nature has provided an assemblage of organs, which, however different in position and structure in the vegetable and animal world, according to the relative peculiarities of the tribes of the two different kingdoms, agree, nevertheless, in the general purpose and intention with which they act, viz. the reception of nutritious materials, their conversion into a form and substance capable of nutrition, and their distribution and application to the various parts of the body of the vegetable or animal existence, for the maintenance or increase of the size and vigour of the individuals.

While it is the advantage of vegetables, however, that, placed in the earth, they have the faculty of imbibing from that, aided by the action of their leaves on the atmosphere, the materials which are used for nutriment, the tribes of the animal kingdom are so situate, that they cannot always find the materials of nurition in the place of residence. While plants subsist principally on water, and such substances as are contained in that fluid, and while their organs have the faculty of converting the elements of this fluid and these substances into fecula, gum, sugar, albumen, oil, lignin, bark, and leaves, animals which subsist partly on plants, and partly on each other, require to be provided with organs which may enable them to move from one place to another in quest of the proper nutriment on which they can thrive.

While to vegetables, therefore, the use of organs of locomotion is unnecessary, to animals they become indispensable; and hence it is the distinguishing character of this class of organized beings that they possess organs of voluntary motion, and all those modifications of organic structure which the possession of such organs implies.

From the principles now explained it seems, in considering the evidences of design, contrivance, and adaptation exhibited by the bodies of plants and animals, to be most natural to begin with those which are simplest and most general, or those which are common to both kingdoms,—viz. those of nutrition; and then to proceed to consider the characters and relations of those organs and classes of organs, which are proper to the animal kingdom,—viz. those of sensation where they are found, and locomotion. Though it is evident that Dr Roget admits the general justice of these views, and the natural relations on which they are founded, he adopts a different method of arrangement in the survey which he takes of the uses of the organic forms of the vegetable and animal tribes. Considering more the capacity of his readers, perhaps, than the natural relations of the different parts of his subject, he begins with the examination of those forms of organic structure, the actions and effects of which are most easily understood. It would be hypercritical, if not censorious, to object to this arrangement, since it is obvious to all that the first quality in every work like the present is, that it be perfectly intelligible, not only in language, but in arrangement and in thought. But we must be permitted to observe, that such a mode of arrangement interrupts the view of the great general object of the Creator, and prevents the reader from perceiving so clearly and distinctly as he would have done, the general unity of design in structure and function manifested in the vegetable and animal kingdoms, had the examination of the locomotive functions been placed under their natural head. By this mode of arrangement, indeed, the locomotive organs are elevated to an undue degree of importance; and the student of nature is almost naturally led to forget that, however important they are in animals, they are in all instances the mere means by which nutriment is provided.

After making these explanations, it is almost superfluous to say, that we shall follow the author, nevertheless, in the course which he pursues, of considering first the mechanical functions, and then those which are more strictly vital.

Dr Roget enters upon the great object of his work, by a general survey of the mechanical functions, or those which depend upon the simple properties of matter, and the well-known laws of mechanism. He first takes a view of the characters of organization in general, which he justly represents to consist of an infinite number of material particles or fibres combined together in a definite manner, and not homogeneous, but presenting a variety more or less multiplied of parts; that is to say, some solid, some fluid, and some semifluid,—and each possessing not only a peculiar mechanical disposition, but peculiar chemical constitution and properties. In illustration of this he proceeds to consider the characteristic properties of vegetable organization. The simplest and most elementary texture in these bodies he represents to consist of very minute vesicles formed by very thin transparent membranes, generally of an oval or globular shape at first, but liable to become changed in consequence of mutual compression, or irregular expansion in the progress of developement. He then considers the modifications which this structure undergoes, in order to form the different elementary textures of plants. The developement or process of growth observed by vegetables next comes under observation; and this he represents to affect chiefly the circular or spiral direction,—a circumstance which, though established as a fact, has not yet been explained in a satisfactory manner.

He next proceeds to consider the subject of animal organization, the simplest form of which, in imitation of Haller and all his adherents, he regards to be the cellular texture; and then takes a general view of the different elementary tissues found in animal bodies, each of which possesses distinctive properties, and is arranged in a definite manner, and for particular purposes in the animal economy.

He then adverts to contractility as the distinguishing character of living bodies,—we believe he should have said animal bodies; allows that this property may exist independent of a fibrous or muscular structure in the lower orders of zoophytes; for instance, the *Infusoria*, *Polypi*, *Medusae*, and the simpler kinds of *Entozoa;* and adduces as the best examples of these proofs of contractility, the rapid vibratory motion displayed by the *Cilia* of the two first families. It is only in animals placed a little above these, for instance, the *Mollusca* and the *Articulata*, that the property of contractility is observed to be connected with organs of fibrous structure or muscles; and while he admits the existence of muscular contractility as the primary moving agent of the animal machine, he denies entirely the existence of this property in the vegetable kingdom. It is unnecessary to follow the author in his examination of the phenomena of muscular action, as exhibited in the different classes of animals.

Dr Roget proceeds to consider the phenomena of the mechanical functions, and the laws by which they are regulated; *first*, in Zoophytes; *secondly*, in the *Mollusca; thirdly*, in the *Articulata; fourthly*, in the Insects; and then in the different classes of the vertebrated animals.

Sensation, and especially locomotion, have been long taught by physiologists to be the proper characters, by the possession of which animals are distinguished from plants. The proofs of sensation are certainly very obscure and indistinct in the lowest of the animal tribes; but all are supposed to possess some degree of locomotion. "Excepting a few among the lower orders of the creation, such as Zoophytes and *Mollusca*," says Dr Roget, "all animals are gifted with the power of spontaneously changing their situation, according to their several wants and necessities, and are thus enabled to seek and to choose those objects that are salutary, and to avoid or reject those that are injurious." It appears from the observations of Dr Grant, which are quoted by Dr Roget with judicious commendation, that the family of *Zoophyta* and *Mollusca* possess the power of exciting motion in the currents of the medium in which they live, but not, at all times of their existence, of locomotion. In the early periods of the existence of these animals, it is remarkable that they possess the power of locomotion for the sole purpose, apparently, of seeking for themselves an abode at some distance from the place of birth, and that, when once fixed, they remain unalterably attached for the remaining period of their existence, and never afterwards give any indication of possessing the faculty of locomotion. This is an arrangement the converse of what takes place in all other animal tribes in which the young possess either none, or a very limited power of locomotion; whereas in the adult animals this power is evidently augmented, and presents its most extensive form.

Is this property of locomotion automatic or inherent in the animal? or are they merely carried along by the motion of the media in which they exist? It appears to be ascertained that the *ova*, or gemmules, or rudimentary animals, when detached from the internal canals of the parent, possess on their rounded extremity microscopic filaments or *cilia*, which are in constant and rapid vibration; and that, by striking the water rapidly, they impel the animal in a particular direction through it. It is ascertained also, that, in the course of two or three days, after the gemmules have been detached from the body of the parent, when they become attached to any substance, they adhere by their narrow extremity, which expands itself laterally, forming a broad basis; and though the *cilia* continue to move for a few hours, these motions soon become languid, and cease entirely, and the *cilia*, being no longer wanted, disappear. This is a singular proof in these minute and otherwise inert animals, of the construction of parts for a temporary purpose, and then of the disappearance of the same parts, when that purpose is completed.

In the *Polypifera*, nearly the same peculiarities in shape, growth, and actions are remarked. The same circular and radiat-process of growth, the same radiated arrangement of parts, especially the *tentacula*,—the same secretion of matter in a fluid state eventually to form a solid basis of support and protection,—the same formation of gemmules and their detachment from the body of the parent,—the same temporary locomotion by means of temporary organs—and the same atrophy and disappearance of these organs when the young animal becomes fixed, with consequent loss of locomotive power may be recognized.

However distinctly the structure and functions of the large animals may indicate the adaptation of organs for certain purposes, and consequently the existence of design and contrivance in the mind of the Creator of these animals, every one who contemplates the structure of the *Phytozoa* must admit that it is in these that the observer recognizes the most distinct and unequivocal traces of Omnipotent agency. Every thing in the structure, form, and actions displayed by these minute animals presents some purpose or intention; and the more they are observed, the more clearly does it appear that a certain harmony of construction and unity of design has been observed.

In the transition from the vegetable organization to that of animals, it is important for the observer of nature to remark the gradual transition of the form of organization, and even of its uses. In the vegetable kingdom, the process of developement affects the circular or spiral direction, so as to give the productions of this kingdom a rounded or cylindrical shape, and a radiated disposition of parts. In the developement of the first or lowest forms of the animal kingdom, the same character in the impulse of developement is observed. Not only is the same simplicity in the arrangement of cells and fibres remarked; but the shape of these bodies is orbicular, or cylindrical, and their organs are arranged in a radiated manner.

" In the construction of the zoophytes," says the author, " nature seems still to keep in view the models of vegetable forms, the characters of which, while effecting the transition from one kingdom to the other, she continues to impress on her productions. Zoophytes, both in their outward form and in the disposition of their internal organs, preserve the symmetrical arrangement round a common centre, so generally exhibited in plants, and especially in flowers, and in the verticillated leaves and branches. Hence the radiated or star-like forms which predominate in most of the animals of this class; and hence they have obtained the title of *Radiata,* by which Cuvier has designated them."

In the polypiferous zoophytes, this progression of organization is still distinctly to be traced, and may be shown to be connected with the functions of the animals. In these tribes, the adult animals are invariably attached like plants to one spot, by means of the formation of a calcareous or horny shell, or basis, which is inorganic. But, though really inorganic, its structure is peculiar, in so far as it is the product of these animals, and consequently the product of organization.

It is also interesting to remark, that in many of these tribes, such, for example, as the *Sertularia,* the resemblance to the vegetable kingdom is observed in the ramified or dendritic arrangement of this deposit; and even in the *Flustra,* in which this deposit is arranged in the shape of minute cells like those of the honeycomb, the general disposition of these cells follows the arborescent or ramified standard of arrangement. Many similar examples are afforded by the Coral, *Gorgonia,* and the *Isis hippuris,* or jointed coral.

It has been often made a subject of inquiry among naturalists, —seeing that, by the arrangement of these polypiferous zoophytes, many living bodies, apparently independent, are found aggregated and living in mutual society and connection,—what are the exact limits of their individuality; whether each is to be viewed as a separate, independent and isolated animal, or the whole of one dendritic body, like productions adhering by the same common root, is to be considered as one individual animal. As each individual possesses a single appropriate mouth with *ten-*

tacula, and may thus be nourished independently of the others, naturalists have been rather inclined to adopt the latter view; and Dr Roget, without deciding very positively, seems disposed to adhere to this opinion.

The Sea Pen, or *Pennatula*, has been alleged by some naturalists to possess the power of swimming by the spontaneous movements of the component polypi; but, according to the observation of Dr Grant, who has watched these animals with great care, they do not possess any locomotive faculty.

The attachment to the solid axis is, according to Dr Roget, the circumstance in the economy of the *Polypifera*, which imposes restraint on their motions; and, accordingly, in the first tribe in which the animal is divested of this restraint, it displays the power of spontaneous locomotion. Of this, as well as of extreme simplicity of construction in the animal kingdom, the *hydra* forms an apt example. This animal, which consists of a mere fleshy tube, open at both ends, possesses the power of moving successively, though very slowly, from one part to another, by inflecting its body in the proposed direction, turning the head by one or more of the *tentacula*, and then approximating the foot or heel to the head;—and in some instances it performs a series of *soubresauts*, or rapid leaps, by incurvating the body, and detaching the foot, while the *tentacula* or mouth adhere.

The *Infusoria* possess still more extensive powers of locomotion; and the Animal Wheel, or *Rotifera*, is provided with an orbicular apparatus on the head, which creates a perpetual circular current in the surrounding fluid, and enables the animal to move with rapidity to and fro.

As the scale of animal existence ascends, the power of locomotion becomes more manifest and extended; and the *Medusa*, the type of the sea Nettles, possesses the power, not only of impelling itself in various directions through the medium, but of sinking or rising to the surface, by contracting its dimensions in a very perfect manner. The *Physalia*, or Portugese man of war, exhibits a still more remarkable piece of mechanism for locomotive impulse, and for sinking and rising through a liquid medium. The upper part of the body is furnished with a purple-coloured membrane, which, as in the *Velella*, serves as a sail to catch the passing breeze, and a large ovoidal air-bladder, which is inflated when the animal wishes to ascend to the surface, and contracted, by the absorption of the air when it descends. It is only in calm weather that these inhabitants of the tropical seas spread the purple sail and distend the oval globe. Whenever the surface is ruffled with a breath of wind, the sail is furled, the vesicle is contracted, and they dive into the tranquil depths of the ocean.

In the *Actiniæ*, or *Sea Anemone* tribe, we perceive the phenomena of forcible contraction to be associated with a still more distinct arrangement of muscular fibres. They have, nevertheless, limited locomotive powers, and adhere in general to the rocks on which they live,—their numerous *tentacula* being chiefly employed in searching in the liquid medium for food, or avoiding the approach of danger.

In the tribes now mentioned, and also in the molluscous families of animals, the organs of locomotion, when present, are evidently destined for progression in a liquid medium. When we pass in our survey to the ARTICULATA, we find that the organs of locomotion are with equal certainty, and more obviously constructed for the purpose of progression on land, or flight through the atmosphere; and in the number which seek their prey in traversing the surface of water, observation recognizes a most perfect mechanical contrivance for sustentation and motion over the surface of a liquid medium.

We find also another proof of regular and progressive deviation in design, in the change of structure exhibited by the MOLLUSCA and ARTICULATA. In the ZOOPHYTA, as far as the *Echinodermata*, the radiated construction and arrangement approaching to that of the vegetable world is observed. The first deviation from this type is exhibited in the MOLLUSCA, which evince less of the vegetable character of radiation, and more of the animal type, In the ARTICULATA, and even in its first or least perfect tribe, the *Annelida* or annulose animals, the radiated structure is entirely abandoned, and a new law of construction is adopted, by which all the parts are symmetrical on each side of the one longitudinal axis, and a vertical plane passing through that axis, and which has therefore been denominated the *mesial plane.*

> " As a direct consequence of this law," says Dr Roget, " we shall find that in the forms which are hereafter to pass under our review, as far as the external organs and general outline of the body are concerned, all that exists on one side is an exact counterpart, like a reflected image, of what is found on the other side. While in the Star-fish, and Echinus, nothing in point of situation was definite, excepting the upper and the lower surface, and there was no side which could be exclusively denominated either the right or the left side, and no end that could be properly said to be the front, or the back, in Articulated, as well as in Vertebrated animals, all these distinctions are clearly marked and easily defined." —Pp. 271, 272.

Dr Roget then describes the annular or ring-like structure of the organs of locomotion in these animals, as the series of horny bands or rings connected by muscular fibres, following the longitudinal direction of the body of the animal, and the mode in which the animal contracts them for progressive motion.

In the locomotive organs of the *Crustacea*, perhaps, the physiological zoologist finds the most remarkable proofs of design and contrivance for the preservation of the individual, and the maintenance of the species. These animals, indeed, Dr Roget is inclined to regard as the more perfect exemplifications of the model of construction first adopted in the mechanism of the *Arachnida*, or spider tribe. They are, indeed, many of them larger and stronger animals; the materials of their bodies are denser, more solid, and less delicate; the parts of their members are articulated with greater care, being generally by strong hinge-joints; and the muscles by which they are moved, and which are contained in the interior of the calcareous or bony support, are if possible, comparatively more energetic and stronger. The *Crustacea* are, nevertheless, constructed much upon the same standard type, and, with the single exception of a greater degree of comparative length of limb, they present in the general mould of organization the same character.

In the following circumstances, however, the *Crustacea* must be viewed as constructed according to a more advanced type of organization. In the *first* place, the head is provided with *antennæ*, and organs used not only for the sense of touch, but apparently for some more delicate perceptions. *Secondly*, The jaws also are provided with *Palpi* or false feet,—organs apparently both of touch, taste, and auxiliary prehension. In the *third* place, in many of the *Crustacea*, as the lobster, crab, and many others, the foremost pair of true feet are constructed in such a manner as to form a pair of very strong pincers or nippers with powerful claws, with notched or serrated edges, which act not only as organs of prehension for receiving articles of food, but as weapons of offence and annoyance; thus showing the solicitude of Nature in making the limb to bear some relation to the size and habitudes of the animal. To these a *fourth* may be added, in the fact that, as the *Crustacea* live principally in an aquatic medium, the tail is fitted with flat scales, which present a broad surface to the water, and is provided with strong muscles for the purpose of motion; and the animal possesses, attached to the lower surface of the body, five pair of false feet, which terminate in a fin-like expansion, and are thereby enabled to act like oars.

The ejection of the calcareous covering in this tribe of animals, though it may at first sight seem like proofs of imperfect construction, must, when fully considered, be regarded as confirmations of great sagacity in the adaptations of structure to particular circumstances. For the sake of protecting the soft and tender parts of their economy apparently, the hard calcareous skeleton is placed externally. But it is quite clear that what is here gained in the way of security, is lost in the ease with which the organs are enlarged and expanded in the progressive growth of the animal. As the organs of nutrition expand, they necessarily become too large for the dorsal part of the skeleton or shield ; and the anterior or abdominal portion, though consisting of pieces only connected by hinges and indentations, yields to the expanding force only imperfectly. The muscles also of the extremities become larger in proportion to the calcareous covering; and after some time must be hampered and restrained in their motions.

A question comes then to be considered, whether the calcareous covering could not have been made to expand and increase, in all its dimensions, by infinite wisdom, as in the case of the skeleton of the BIRDS and MAMMALIA ? The answer to this objection is, that the great firmness and density of this structure or crust does not admit of this species of extension. It is not organized as bone ; but is deposited as a secreted product in a membrane consisting of little phosphate, and a large quantity of carbonate of lime, for the express purpose of giving hardness and solidity.

In order, however, to compensate for this inconvenience, the *crust*, as it is denominated, is periodically ejected, according as the increasing size of the soft organs requires ; and the organs of the animal possess the power of secreting a new calcareous covering adapted to the increased size of its body and the several organs. Of this curious process, which was well described by Reaumur, Dr Roget gives the following account.

" The tendency in the body and in the limbs to expand during growth is restrained by the limited dimensions of the shell, which resists the efforts to enlarge its diameter. But this force of expansion goes on increasing, till at length it is productive of much uneasiness to the animal, which is, in consequence, prompted to make a violent effort to relieve itself; by this means it generally succeeds in bursting the shell; and then, by dint of repeated struggles, extricates its body and its limbs. The lobster first withdraws its claws, and then its feet, as if it were pulling them out of a pair of boots: the head next throws of its case, together with its antennæ ; and the two eyes are disengaged from their horny pedicles. In this operation, not only the complex apparatus of the jaws, but even the horny cuticle and teeth of the stomach, are all cast off along with the shell: and, last of all, the tail is extricated. But the whole process is not accomplished without long continued efforts. Sometimes the legs are lacerated or torn off, in the attempt to withdraw them from the shell; and in the younger crustacea the operation is not unfrequently fatal. Even when successfully accomplished it leaves the animal in a most languid state: the limbs, being soft and pliant, are scarcely able to drag the body along. They are not, however, left altogether without defence. For some time before the old shell was cast off, preparations had been making for forming a new one. The membrane which lined the shell had been acquiring greater density, and had already collected a quantity of liquid materials proper for the consolidation of the new shell. These materials are mixed with a large proportion of colouring matter, of a bright scarlet hue, giving it the appearance of red blood, though it differs totally from blood in all its other properties. As soon as the shell is cast off, this membrane, by the pressure from within, is suddenly expanded, and by the rapid growth of the soft parts, soon acquires a much larger size than the former shell. Then the process of hardening the calcareous ingredient commences, and is rapidly completed; while an abundant supply of fresh matter is added to increase the strength of the solid walls which are thus constructing for the support of the animal. Reaumur estimates that the lobster gains, during each change of its covering, an increase of one-fifth of its former dimensions. When the animal has attained its full size, no operation of this kind is required, and the same shell is permanently retained."—Pp. 292–294.

The care of the Supreme Creator is further still more forcibly and clearly exemplified in providing for the exigencies of this large periodical consumption of carbonate of lime.

" A provision appears to be made, in the interior of the animal, for the supply of the large quantity of calcareous matter required for the construction of the shell at the proper time. A magazine of carbonate of lime is collected, previous to each change of shell, in the form of two rounded masses, one on each side of the stomach. In the crab these balls have received the absurd name of crab's eyes; and during the formation of the shell they disappear."—P. 294.

The same degree of solicitude is displayed in making provision for the repair of parts which have been lost or injured by accident.

" It is well known that when an animal of this class has been deprived of one of the claws, that part is in a short time replaced by a new claw, which grows from the stump of the one which had been lost. It appears from the investigations of Reaumur, that this new growth takes places more readily at particular parts of the limb, and especially at the joints; and the animal seems to be aware of the greater facility with which a renewal of the claw can be affected at these parts; for if it chance to receive an injury at the extremity of the limb, it often, by a spontaneous effort, breaks off the whole limb at its junction with the trunk, which is the point where the growth more speedily commences. The wound soon becomes covered with a delicate white membrane, which presents at first a convex surface; this gradually rises to a point, and is found on examination to conceal the rudiment of a new claw. At first this new claw enlarges but slowly, as if collecting strength for the more vigorous effort of expansion which afterwards takes place. As it grows, the membrane is pushed forwards, becoming thinner in proportion as it is stretched; till at length it gives way, and the soft claw is exposed to view. The claw now enlarges rapidly, and in a few days more acquires a shell as hard as that which had preceded it. Usually, however, it does not attain the same size; a circumstance which accounts for our frequently meeting with lobsters and crabs which have one claw much smaller than the other. In the course of the subsequent castings, this disparity gradually disappears. The same power of restoration is found to reside in the legs, the antennæ, and the jaws.

"We must naturally be curious to learn, if possible, from what source these astonishing powers of regeneration are derived. Reaumur hazarded the conjecture, that there might be originally implanted in each articulation a certain number of embryo limbs, ready to be developed as occasion might require; somewhat in the way in which the rudiments of the secondary teeth remain concealed in the jaw, in preparation for replacing the first set when these have been removed. But this hypothesis is overturned by the fact, that if the animal loses only part of the limb, it is the deficient portion alone, and not the whole limb that is regenerated. The sprouting of the new claw bears a strong analogy to the budding of a plant; both having their origin from an imperceptible atom, or germ, which is either formed on the occasion, or had preexisted in the organization. We are, however, totally destitute of the means of deciding which of these alternatives is nearest to the truth. It is but too probable that the agents which can effect such wonderful operations will ever baffle our most scrutinizing inquiries, and that they are of too refined an order to come within the reach of the most subtle conjectures that human imagination can devise."—Pp. 264–296.

It appears to us that the speculation as to the immediate agent by which this species of separation is effected is not a legitimate object of human inquiry, and is by no means requisite to complete the argument as to the general existence of design in the arrangement. The fact is, as now stated, that, when either the old crust becomes inadequate, by losing the relation of proportionate size, to contain conveniently the internal parts, or when it is injured or lost, the organic textures of the animal have the faculty of secreting a new material for the purpose of repair. It is clear that these textures are so constituted as to possess this power, and to be capable of assuming the new action the moment they are required to do so. To know the exact mechanism by which they do so would be very desirable. But it is by no means requisite to the satisfactory demonstration of the existence of design. That is abundantly established by the fact that separation does take place under the circumstances requiring it.

It may become a subject of most just inquiry whether the student of nature does not recognize more numerous and more impressive proofs of wise design and beautiful adaptation of mechanism in the bodies of the insect tribes than in those of animals formed on a larger scale. To perceive in these minute animals not only all the muscles and the crusts which they move, arranged with the most perpect precision; to observe in the creeping *larvæ* of those which undergo transformations, all the rudiments of the parts composing the future flying animal; to observe the means by which the same animal crawls along the ground, or wings its flight through the air; to remark the beautiful and perfect mechanism by which these animals can move along a ceiling, and sustain themselves in opposition to the force of gravity; and to observe the singular contrivance by which several of them are enabled to traverse the surface of water without sinking in it, are circumstances which cannot fail to strike with wonder and delight every one who takes pleasure in contemplating the resources of accurate mechanism. To explain this, however, is sometimes a matter of difficulty.

Observe, for instance, the common blue-bottle or the house-fly, on the pane of a window or the ceiling of a room, and consider how securely he supports his whole body against the force of gravitation. Is this casual, or is it intentional; and what are the means by which it is effected? Dr Roget adopts the explanation originally given by Derham, and more recently reproduced by arguments and observations advanced by Sir Everard Home, illustrated by the delineations of his able observer, M. Bauer, and admitted by Messrs Kirby and Spence. "The apparatus," says Dr Roget, "consists of suckers, the arrangement and construction of which are exceedingly beautiful; and of which the common house-fly presents us with an example. In this insect that part of the last joint of the tarsus which is immediately under the root of the claw, has two suckers appended to it by a narrow funnel-shaped neck, moveable by muscles in all directions. In the blue-bottle fly, the sucking part of the apparatus consists of a membrane, capable of contraction and extension, and the edges of which are serrated so as to fit them for the closest application to any surface."—P. 332, 333.

According to the observations of Mr Blackwall, however, this anomalous mode of progression and sustentation exhibited by these animals is not quite so easily understood as we have been taught to believe it. The discordance of the accounts given by the different observers of the mechanism in question led Mr Blackwall to inspect the parts himself with a powerful compound microscope; and we give his description in his own words.

"Minute hairs, very closely set, and directed downwards, so completely cover the inferior surface of the expanded membranes improperly denominated suckers, with which the terminal joint of the *tarsi* of flies is provided, that it cannot be brought into contact with the objects on which those insects move by any muscular force they are capable of exerting. The production of a vacuum between each membrane and the plane of position is therefore clearly impracticable, unless the numerous hairs on the under side of these organs individually perform the office of suckers; and there does not appear to be any thing in their mechanism which in the slightest degree countenances such a hypothesis." *

Mr Blackwall then found upon enclosing in jars and phials of transparent glass, specimens of the house-fly (*Musca domestica*,) and the flesh-fly (*Musca vomitoria*,) that they traversed the interior of these vessels in every direction with facility, even with the backs downwards, so long as they remained in full vigour; but that when enfeebled either by cold or long continued and over-exertion, the identical flies ascended the sides of the glass with difficulty, and were quite unable to maintain themselves with the feet uppermost. As soon, however, as they were recruited by rest or warmth, they resumed with agility those singular modes of progression, which their frequency only make us to regard with indifference. Mr Blackwall further found, that flies which are unable to maintain the inverted position on highly polished bodies, often adhere firmly with the feet uppermost to glass defective in polish or slightly soiled.

From these and similar facts, Mr Blackwall infers, that flies are not supported on the pane of a window or the cieling of a room, either by the pressure of the atmosphere, as was maintained by Derham and Home, or by the aid of a glutinous secretion, as was imagined by others,—but as was originally conjectured by Hooke, from accurate microscopical observation, by means strictly mechanical. It appears, in short, that the house-fly is able, while its vital powers, especially the function of respiration, continue energetic, to traverse not only the upright sides of smooth surfaces, such as glass, but even the interior dome of a glass receiver; and that it ceases to do so from loss of muscular power ensuing upon impeded respiration.

We have brought forward these facts on this peculiar faculty exhibited by several of the dipterous insects, because it is one of the few points in the present work to which the learned author has devoted less attention, perhaps, than the subject demanded. We really feel unable to say how far the views given by Mr Blackwall are entitled to a greater degree of attention than those usually given since the supposed discovery of Sir Everard Home. But, whatever opinion be entertained on their validity, it is clear that the explanation of Sir Everard Home cannot be admitted with propriety in a work like the present, to the exclusion of that originally suggested by Dr Hooke, and since revived by Mr Blackwall. It is almost superfluous to remark, that the change of explanation does not affect the question of the accuracy with which the mechanism effects its purpose.

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* On the Pulvilli of Insects, Linnean Transact. Vol. xvi. part iii. p. 488.

The aquatic insects, or those destined to live in damp watery places, present some curious modifications in the mechanical functions. Observe the *Dytiscus*, or water-beetle, moving over the smooth surface of the pool, not only provided with a body specifically lighter by its construction than the medium on which he moves, and of a boat-like shape in general, but with the posterior legs thick, strong, and flattened, and the *tarsi* compressed and greatly ciliated, so as to act like oars in the watery expanse. The water-boatman or *Notonecta*, on the other hand, meets the same exigency in a different manner. This little creature, which always floats on the back, is so constructed, that the centre of gravity is above the centre of the whole body or metacentre; while the long flat oar-like legs, proceeding from the mesial plane of the abdominal surface, are used as sculls or oars.

A singular disproportion in the size and figure of the anterior and posterior legs, in relation to each other, and to the whole body, occurs in the *Gryllotalpa*, or mole-cricket. In this singular and rather formidable-looking insect, while the mesothoracic and metathoracic or second and third pairs of legs correspond in size and length to the size of the animal's body in general, the prothoracic or first pair of legs are short, yet thick, strong, massy, and energetic, and are provided with short thick teeth or claws, for the express purpose of digging and throwing back the earth while burrowing. The same animal is provided with long posterior or caudal *antennæ*, which are required in groping its way, and recognizing the presence of danger, as the animal moves in a retrograde as well as in the advancing direction. It is perhaps difficult to imagine a more remarkable example of unrivalled skill and power employed in the construction of instruments so perfect, yet to be disposed of and contained in so small a compass.

Though the gaudy colours of the butterfly tribe are certainly calculated to inspire the feelings of wonder and delight in a very exquisite degree, and the observer of nature becomes still more penetrated with the idea of wise and systematic contrivance, when he observes the progressive transformation which these creatures undergo, from the crawling and loathed caterpillar to the admired butterfly;—yet there is, perhaps, a subject of not less interest found in the humble and despised family of beetles. The apt and powerful mechanism by which these animals elevate and depress their wings as they prepare for flight or creeping, and the accurate manner in which the wings are covered and protected by the wing-cases, afford probably the most extraordinary example of the application of vital organs to produce mechanical effects in the whole compass of physiological physics. The wings are elevated and depressed by strong muscles; and in the cockchaffer or *Melolontha*, especially, which has been most carefully dissected by M. Straus Durckheim, the muscles which depress the wings are of immense size, and very powerful. When the wings are elevated, they must be retained in this position, and this is also effected by elevators; the power of which, if we judge by their effects, must be enormous. Linnæus computed that this animal is, in proportion to his bulk, more than six times stronger than the horse; and asserts that, if the same proportional force which is possessed by the stag-beetle, another individual of this family, had been given to the elephant, he would have been capable of tearing up by the roots the largest trees, and hurling immense masses of rocks against his assailants. The immense muscular force, indeed, of some of the coleopterous insects is seen in some of the larger genera; and in those which feed on wood, the jaws are large, hard, and strong, and moved by very powerful muscles.

We must not, however, dwell on this subject, which might fill volumes; but shall give the following summary by the present author, on the peculiar arrangements of the muscles within the hard parts;—the agents within the bodies to be acted on.

"But while we must admit that all these facts indicate a remarkable degree of energy in the contractile power of the muscular fibres of insects, we should at the same time recollect that the diminutive size of the beings which display those powers is itself the source of a mechanical advantage not possessed by larger animals. The efficacy of all mechanical arrangements must ultimately depend on a due proportion between the moving and the resisting forces: hence mechanisn of every kind must be adjusted with reference not merely to the relative, but to the absolute dimensions of the structures themselves. This will be evident when we consider that the forces which are called into action are resisted by the cohesion of the particles composing the solid parts of the machine: and this cohesion, being not a variable but a constant and definite force, must necessarily limit the dimensions of every mechanical structure, whether intended for stability or for action. An edifice raised beyond a certain magnitude, will not support itself, because the weight of the materials increases more rapidly than the strength. How often has it been found that a machine which works admirably in a small model, will totally fail in its performance when constructed on a larger scale? Any lever, of whatever form, may be increased in its dimensions until the force of gravity becomes superior to the cohesion of it own particles: and consequently any structure, like a vegetable or animal body, composed of a combination of levers, would, if its size were to exceed a certain limit, fall to pieces merely by its own weight. This can be prevented either by employing materials of greater cohesive strength, or by increasing, at the points where the strains are greatest, the thickness of the parts compared with their length: but the choice of materials is necessarily restricted within narrow limits, and the latter expedient would entirely alter the relative proportions of the parts, and would require a complete change in the plan of their construction." —Pp. 359, 360.

How truly, in short, was it said by the contemplative poet, of the skill, wisdom, and power displayed in these animals, that it was really more wonderful than the construction of larger animals.

> " Contrivance intricate, expressed with ease,
> Where unassisted sight no beauty sees,
> The shapely limb, the lubricated joint,
> Within the small dimensions of a point.
> Muscle and nerve miraculously spun,
> His mighty work, who speaks and it is done;
> The Invisible in things, scarce seen, revealed,
> To whom an atom is an ample field."

The peculiar manner and minute scale upon which the organs of these animals are constructed is, in short, adapted to the size of the animals; and accordingly, Dr Roget proceeds to observe that a mode of construction entirely different must have been required, had these animals been only somewhat larger. " In passing from the smaller to the larger animals, we find, accordingly, that new models are adopted, a new order of architecture introduced, and new laws of developement observed. We have, next, then, to direct our attention to the procedure of nature in the execution of this more enlarged and comprehensive scheme of animal organization.—P. 360.

From the INSECTS, the last and perhaps the most perfect of the invertebrated animals, Dr Roget passes, by a natural transition, to the vertebrated animals, the mechanical functions of which are then surveyed in the usual order, ascending from the FISHES by the REPTILES, to the MAMMALIA and BIRDS.

In this survey, the learned author reviews the various departments of the subject in the following order. After a few preliminary observations on vertebrated animals, and their organic characters in general, he considers the structure and composition of bone,—their peculiar organic element, the mode in which it is formed,—the characters of the spino-cerebral axis,—the structure of the vertebral column and the component vertebræ, the *cranium*, and the skeleton generally. The author justly represents the transition in structure and anatomical arrangement, from the highest of the INVERTEBRATA to the lowest of the VERTEBRATA,—from the Crustacea to the Fishes, to be found in the *Loligo* or cuttle-fish, and the *Myxine* or gelatinous hag.

" An approximation is evidently made towards an internal skeleton in the cephalopodous mollusca; where we find a central body, cartilaginous in some species, calcareous in others. In the Loligo it has a long and slender shape, and is pointed at the end like the blade of a sword; it bears, as we shall hereafter notice, some resemblance to the cartilaginous spine of the fish called the *Myxine,* or *Gastrobranchus,* which does not enclose the spinal marrow, but only admits it to pass along a groove in its upper edge.

"All these multiplied instances, when weighed together, and united in a comprehensive view, are sufficient to prove, that there exists very perceptible links of connection among all the classes of created beings, even in those apparently the most remote from one another. They render it clear to the discerning eye of the philosophic naturalist, that all the races of animated beings are members of one family, and the offspring of the same provident parent, who has matured all his plans on a deeply premeditated system, and who dispenses all his gifts with the most salutary regard to the general welfare of his creatures."—P. 407.

This is followed, in a separate chapter, by a view of the organs of support and locomotion in fishes, and the peculiar contrivances adopted for the purpose of progress through the medium in which they live.

Dr Roget treats then of the same functions in the reptiles, and traces with much talent, and in an interesting manner, the modifications which the locomotive organs present in the different stages of existence in this division of animals, and in the four great families into which they are naturally divided, of Batrachoid, Ophidial, Saurial, and Cheloniad Reptiles.

To this succeeds the consideration of the locomotive organs in the MAMMALIA, and in the BIRDS.

We would willingly accompany the author in his interesting observations on the mutual connections of these different tribes, and on the examples of uniformity of design manifested in the construction of the respective forms of locomotive organs allotted to each. But this our limits at present forbid; and we must be satisfied by referring our readers generally to the work, in which they will at once find interest excited and maintained, and information communicated in a pleasing manner, and a general spirit of philosophy inspired.

We are scarcely in a condition in the present stage of our observations on this work to speak more strongly or more in detail of its merits. We may be peculiar in thinking that the subjects of the *first* volume are perhaps less deeply and powerfully interesting than those of the second. We must, however, observe, that Dr Roget has been very successful in a subject of such unbounded extent, and so multifarious and manifold in its details, in selecting those topics principally which serve not only to sustain the general interest of the disquisition, but to accomplish the great purpose of his undertaking, the demonstration of wise Design in devising, consummate Power in execution, and unremitting Benevolence in the preservation of all the parts and classes of the animal kingdom. When we bear this in mind, we feel, that, for any little oversights, there is no just ground of complaint, and we have only to express our admiration, that, in a subject of such extent, the whole has been so ably and so happily accomplished.

The style in which this work is composed, presents so happy a contrast to many that we are compelled, in the course of our vocation, to peruse, that we feel it would be wrong to pass its excellencies over in silence. It is always perspicuous and correct, often elegant and dignified; and throughout it breathes the pure feelings of an enlightened, philosophical, and benevolent mind.

ART. II.—*Cyclopedia of Practical Medicine, Article Tubercular Phthisis.* By Dr JAMES CLARK.

FEW medical men have enjoyed more favourable opportunities for studying the phenomena and investigating the nature of pulmonary consumption than Dr James Clark. He practised in Rome during many years, at a time when hundreds of his invalid countrymen annually flocked to the south and, by resorting to him for advice, afforded him a wide and varied field of observation. These opportunities were afterwards extended by the publication of his excellent work on the influence of climate on the prevention and cure of disease,—a work which not only established his reputation as a skilful and discriminating physician, but led to his being extensively consulted on his return to England in the same description of cases with which he had been so conversant abroad. The admirable treatise we are now to notice embodies the results of both his former and his recent experience; and we are much mistaken if it does not raise its author to a still higher rank in the estimation of his brethren, and in the confidence of the public.

The remarkable prevalence of scrofulous and tubercular affections, the obscurity in which their origin and nature are still involved, and the fatality which attends their progress, render their farther elucidation a matter of the highest importance. So that, whether we regard the inherent interest of the subject, or the fitness of the author to do it justice, the work before us posses the strongest claims on our attention.

Having already so often expressed our sense of the value Laennec's diagnostic method, and commented on the success researches of Bayle, Louis, Andral, and others, who have f lowed in his footsteps, we shall not recur to them at present, merely state, that, although a variety of different affections formerly comprehended under the name *phthisis*, the term now applied to designate exclusively that form of pulmon disease which arises from the formation and breaking down tubercles in the lungs, and in this sense alone it is used by Clark. The history of consumption and that of tuberculo disruption are thus identical, the one being the direct result the other.

Different opinions prevail on the origin and nature of pulm nary tubercles. By most writers they are regarded as essential a local affection, in which the general system does not parti pate until the local ailment has made considerable advances, a has excited that febrile disturbance which almost always atten the later progress of protracted internal disease. In support of t view it is argued, that tubercles may exist for years in a dorma or inactive state, and the patient continue to enjoy tolera health so long as every source of irritation likely to excite the to activity is carefully avoided; whereas, from the moment the progress becomes accelerated, the constitutional disorder kee pace with the local affection.

In so far as this opinion considers the degeneration of t bercles to be the essence, or *sine qua non*, of *pulmonary phth sis*, Dr Clark fully concurs in it. But he goes a step farther ba in the inquiry than is commonly done, and seeks to discov what the peculiarity is which induces the original formation tubercles, in preference to every other kind of morbid action in t part, and justly insists, that that condition, whatever it may —and not the appearance of tubercles, is truly the first stage the disease; and we are inclined to consider the success wi which he demonstrates this important position as perhaps t chief and distinguishing excellence of the book.

Let us, however, not be misunderstood. Dr Clark admit as every one must do, that the febrile disturbance which atten the later stages of tubercular disease is sympathetic of the loc irritation, and is proportioned in degree to its extent and to t excitability of constitution. But this disturbance is subseque to and totally distinct from the constitutional disorder which h believes to precede and give rise to the tubercular deposit; an it is of the latter alone that we are now speaking.

To that condition of the general system which induces t deposition of tuberculous matter from causes which, without its concurrence, would prove wholly inadequate, and which is manifestly in itself a departure from health, Dr Clark gives the name of *tubercular cachexia;* and, if the view which he gives of its relation to the future disease be correct, its practical value can scarcely be over estimated, as it affords a surer and more consistent guide for both the preventive and curative treatment than any we have hitherto possessed; that it possesses a high degree of probability will, we think, be apparent to every one who will take the trouble to examine the evidence on which it is founded, and observe the progress of tubercular consumption.

The influence of the constitutional state in favouring the subsequent developement of tubercles is well exemplified in the hereditary tendency to consumption which is observed to be transmitted from parents to offspring. In these instances, it is generally, though not always, as was justly maintained by John Hunter, the predisposing state of the system, and not actually formed tubercles, which is inherited by the child. Were it otherwise, few such children could survive the first months of existence; whereas it is notorious that numbers of them pass their infancy in the apparent enjoyment of health, and do not become phthisical till rapid growth impairs their stamina, or till attaining the age at which the disease first developed itself in their parents.

The above fact is sufficient of itself to prove that the constitutional state, preceding and giving rise to the formation of tubercles, is really the most important element in their production; and such, in fact, is the only inference which accords with the phenomena. When, for example, in individuals previously healthy, either in man or among the lower animals, tuberculous deposition in any of the living tissues is brought about by deficiency of food, the local effect is manifestly the result of a pre-existing constitutional cause; and as the latter is the *origo mali*, the true source of danger, it becomes a primary object with the physician to discover the earliest signs of its existence, to ascertain its causes and nature, and to endeavour to obviate these by every possible means; and it is to delay too long to wait the actual formation of tubercles, and then seek by care to arrest their farther progress.

In most medical works, however, the preceding constitutional disorder is not sufficiently adverted to, and the disease is considered to begin only with the first deposition of the tuberculous matter; while, consequently, every care is recommended, with a view to avoid exciting the dormant tubercles to activity, little or nothing is inculcated in the way of preventing their deposition: whereas, if Dr Clark's views be correct, it is obviously the signs which indicate the rise and progress of the tubercular *cachexia*, and the causes by which it is induced, which ought in an especial manner to engage our attention, and claim our remedial measures. At this early period the disease is still amenable to treatment, and the tubercular disorganization may often be prevented; and it is only by measures directed to this end that the prevelance and fatality of consumption can ever be effectually diminished.

It is common to ascribe the origin of pulmonary tubercles to neglected colds, damp or wet clothes, exposure to the weather, sudden changes of temperature, breathing an atmosphere loaded with foreign and irritating substances, &c. But experience shows, that it is only where the tubercular predisposition, either natural or acquired, already exists, that these causes prove sufficient for their production. Innumerable instances accordingly occur, of well constituted persons being exposed for a long time to the operation of the same influences, without tubercular disease being induced either in the lungs or in any other organ. And, on the other hand, where the individual lives surrounded by circumstances which favour the development of the tuberculous *diathesis*, tubercles are formed not only in the lungs, but in the various other organs of the body, on the application of causes which, but for the predisposition, would never have disturbed the general health. A soundly constituted person may survive an injury involving the loss of half a lung, and his health be scarcely perceptibly impaired; whereas in another, a tenth part of the same injury would have destroyed life, by causing the deposition of tubercles within a few days of its infliction. Hence the state of the system which tends to the formation of tubercles is really the first stage of the disease, and ought to have the most earnest attention of the physician from its earliest dawn.

Deeply impressed with the practical value of this leading principle, Dr Clark passes in review the various sources from which the tubercular *cachexia* is observed to spring, and the features by which its existence may be recognized. He traces it first as the result of hereditary transmission from parent to child, and makes the important remark, that the offspring may derive the tuberculous constitution from the parents, without either of the latter being himself subject to it. In the majority of cases, no doubt, the parent is also imbued with it; but it often happens that bad health in the parent from any other cause, and especially from severe dyspepsia, enfeebles the constitution of the offspring, so far as to impart to it an unusual susceptibility of tuberculous disease; and this great truth cannot be brought too prominently under the notice of parents as well as of the profession. It affords a strong stimulus not only to avoid ill-assorted marriages, but to observe that line of conduct which, by regularity, temperance, and useful activity, shall most conduce to the health and vigour of all the bodily functions. When we see our own errors and neglect punished in the persons of our children, and heaping unmerited suffering upon them, we cannot but feel doubly interested in every means which shall add to our power of preserving health, and preventing the future inroads of disease.

Dr Clark next touches upon the almost insane conduct of many mothers during pregnancy, as producing a very deleterious influence on the constitution of the child, and rendering it unusually susceptible of tuberculous disease in after life. From sheer ignorance, the mother is often not aware that her gaieties, late hours, crowded assemblies, dances, and general mode of life, have any effect whatever on the fate of her offspring; and thus she sins confidingly, and without hesitation, where perhaps a well-timed expostulation from her medical attendant might have been the means of preventing mischief, and obviating much future regret.

Among the lower orders, the infant continues exposed after birth to many influences, which, if left unsuspectingly in full operation, are certain, sooner or later, to induce that constitutional state which is so favourable to the formation of pulmonary tubercles from otherwise inadequate causes. Bad nursing, injudicious feeding, neglect of cleanliness, impure air, imperfect clothing, a low damp situation, domestic discomfort, and, in short, every thing which tends to impair nutrition and induce debility, are all of this description; and we are quite satisfied, that the more their influence is investigated, the more completely will the reader go along with Dr Clark, in the pains which he takes to inculcate their importance in the production of tuberculous disease. And, accordingly, although it was long believed that consumption was rarely met with till near the age of puberty, it is now ascertained that many children fall victims to it, even in the earliest years of life.

On continuing our review through the successive periods of life, from infancy to old age, the same great truth of the dependence of tubercles on a constitutional or general, and not a merely local cause, will become more and more evident; but want of room prevents our entering into the details necessary to establish the fact. For these we must refer the reader to Dr Clark's own pages, and at present shall merely add, that we think the author has rendered an essential service to medical science, by the success with which he has traced the connection between the tuberculous diathesis and the various forms of dyspeptic disorder, and explained the undoubted influence which abdominal congestion has in inducing tubercular disorganization in the lungs. Dr Wilson Philip has long since called the attention of the profession to what he calls dyspeptic phthisis, as in its early stage a curable form of consumption; but Dr Clark more justly, we think, regards it as merely the first stage of ordinary tubercular phthisis, and thinks that the ultimate result, viz. the formation and softening of pulmonary tubercles, is the same in this as in the other varieties of the disease. In dyspeptic phthisis, the imperfect assimilation consequent on protracted indigestion is considered by Dr Clark as the true source of the tuberculous diathesis in such cases.

In support of this opinion, Dr Clark remarks, that, in children of a strumous habit, we observe a constant disposition to a congestive state of the abdominal circulation, which, if not obviated, is sure to induce tuberculous disease, and death at an early age. In youth the same state is often the precursor of tuberculous *cachexia* ; but it is in middle life, between the ages of thirty-five and fifty, that the congestion shews itself by marked dyspeptic symptoms, which exist for a length of time, and not unfrequently obscure the tuberculous disease till too late. The latter, indeed, rarely occurs at this period of life without protracted dyspeptic disorder preceding its appearance, and it can scarcely be doubted that the digestive derangement is often a mere consequence of a long pre-existing state of congestion in the venous system of the abdominal viscera,—a state which Dr Clark describes as familiar to many of the pathologists of the last century.

Our own experience goes far to confirm the truth of these remarks, and we are convinced that, by going farther back in the chain of causes than we are accustomed to do, and adopting the preventive measures which are then applicable, a great deal may be done both in warding off and in arresting the progress of tubercular consumption. Every page of Dr Clark's treatise seems to have been written under this conviction, and it contains scarcely a line which does not admit of a direct and obvious application,—a feature which has always appeared to us to be eminently characteristic of truth. Views which, although ingenious, are not true, seldom admit of any other than a forced or unnatural application, while truth alone harmonizes with every thing around it, as if intentionally fitted for the place which it is made to occupy.

After showing how the causes of tubercular *cachexia* at the different periods of life may be most successfully guarded against, so as to prevent its formation, Dr Clark proceeds to consider how the diathesis ought to be treated when it is once formed, but before the actual deposition of tubercles has taken place. In this important part of the inquiry, he discusses the employment of mercury, taraxacum, sarsaparilla, sulphur, mineral waters, and a variety of other remedial agents, such as purgatives, tonics, bathing, travelling, &c. on each of which he offers some very judicious observations, for which we cannot find room, and which we strongly recommend to the careful perusal of the reader.

The principles of treatment laid down by Dr Clark, and his remarks on the various remedies which have been recommended for the cure of phthisis, are characterized by the same sound sense, discriminating observation, and direct practical aim which distinguish all his writings, and which render him so safe a guide to men of less skill and experience than himself. It requires no one to rise from the dead to tell us how useless all the means employed for the discussion of tubercles have hitherto proved, and how hopeless our expectations of cure must consequently be after tubercles are fairly formed. But we cannot dismiss the subject without adverting to the recent employment of emetics on an extensive scale in the cure of phthisis by Dr Giovanni de Vittis, at the military hospital at Capua. Almost all the consumptive patients belonging to the Neapolitan army are sent thither for treatment; and antimonial emetics having been administered daily to every case which occurred between the 1st May 1828 and 16th January 1832. The result was, that in that time 40 cases of chronic catarrh, 47 of phthisis in the first stage, 102 in the second, and 27 in the third, were discharged cured. We are far from thinking that all of the above were cases of tubercular phthisis, or that all were really cured who were discharged as cured; but after making every allowance, enough remains to show that great advantage may be derived from the judicious use of emetics, where phthisis, if not actually formed, is at least evidently impending. Dr Clark, adopting Dr Carswell's view of the gradual deposition of tuberculous matter on mucous surfaces, conceives that the repeated action of emetics may, from their well known power of increasing the bronchial secretions, and facilitating their expectoration, be really useful in preventing the accumulation of tuberculous matter in the air-cells and minute ramifications of the bronchiæ,—and consequently the *localization* of the disease,—till time has been given for the cure of the constitutional disorder. Whether the author is correct in his pathology, we shall not now inquire; but it cannot be denied that formerly, when emetics were in more general use than they now are, practitioners of the highest merit gave strong testimony to their usefulness, in the very outset of the disease. Now that we possess in auscultation the means of a more accurate diagnosis than our predecessors, it would certainly be desirable that a cautious trial were made, and the results communicated to the profession.

Dr Clark thinks that the action of emetics is not limited to their direct effect on the lungs, but that they are also serviceable by improving the abdominal secretions, and obviating the venous congestion which so often precedes the developement of the tubercular constitution. We are acquainted with one or two facts which strikingly corroborate this opinion. One was the case of a patient who, after being ill for several months of what was considered to be phthisis, was advised to try the effect of a sea voyage. The first four weeks were unusually stormy; and, for more than three weeks, the patient was in a state of almost constant nausea, and not unfrequently of severe sickness. At the end of that time all the pulmonary symptoms were for the first time mitigated, and although the debility and emaciation had increased, the feeling of returning health was again perceived, the appetite and digestion were improved, and recovery went on steadily though not rapidly. In this case the abdominal functions underwent improvement at the same time as the pulmonary ailment, and the state of the skin—in our opinion a very influential consideration—also became more healthy and natural than it had been for months before. These facts, we think, demonstrate the propriety of farther inquiry; and we trust that those members of the profession whose opportunities are favourable will endeavour to ascertain, not only the circumstances under which emetics are likely to be advantageous, but the cases in which their action is likely to be injurious. Their utility must, we suspect, be limited to the earliest threatening of tubercular disease.

It is unnecessary to notice Dr Clark's opinions on the influence of climate, and on the various other remedial agents employed in the treatment of tubercular phthisis. We have ourselves enjoyed numerous opportunities of witnessing the effects of climate in every stage of consumption, and we cordially bear our testimony to the soundness and value of the views on this subject inculcated by Dr Clark. Indeed, taking the treatise as a whole, we are acquainted with few which can be compared with it, either for the interest and importance of the subject, or for the clear, philosophical, and truly practical manner in which its doctrines are developed; and we cannot recall any monograph, from the diligent study of which not only the student, but the practitioner, may derive more satisfaction and substantial professional advantage.

Since the preceding pages were in types, a republication of Dr Clark's dissertation, in the form of a separate volume, has been announced, under the title of *A Treatise on Pulmonary Consumption, comprising an Inquiry into the Causes, Nature, Prevention, and Cure of Tuberculous and Scrofulous diseases in general.* The work, we understand, has been considerably enlarged, and some parts of it almost rewritten. In its present form, the arrangement and a few of the minor details are in some respects defective. In the forthcoming editions, these imperfections will no doubt be removed.

ART. III.—*Du Procédé Operatoire, &c. Of the Operative process to be followed in the examination of Organs by Mediate Percussion, and a collection of Memoirs on Physiology, Pathology, and Diagnosis.* By P. A. PIORRY, D. M. P. &c. Paris and London, 1830. 8vo. Pp. 431.

IN the last number of this Journal we noticed briefly M. Piorry's Treatise on Mediate Percussion, contained in the first part of the volume before us, and we now proceed to examine the first of the memoirs on certain points of physiology, pathology, and diagnosis, which constitute the concluding portion. These, as mentioned in our last article, are arranged under four heads, the first consisting of three papers on the circulation, the second of three on respiration, the third of two on the digestive organs, and the fourth of one on a species of megrim. We confine our notice to the first three papers.

A. 1. *On losses of Blood.*—The first paper contains M. Piorry's experiments on animals, and observations on man, together with his views of the loss of blood in general, the influence of gravity on the circulation, general considerations on syncope and cerebral congestion, and some observations on death by syncope, and on phlebotomy. According to M. Piorry, blood to the extent of the twenty-fifth or even the twentieth of the weight of the body, may be abstracted at one time, from a healthy man or animal, without producing serious inconvenience. On some dogs a tenth may be abstracted. In animals of different ages, the results are nearly the same. Very young children affected with acute *tracheitis* have borne large bleedings without being much weakened by them; but from numerous facts, it is evident, that convulsions are frequently the result of carrying blood-letting too far. A copious blood-letting carried to syncope in general produces few bad symptoms on the succeeding days, weakness alone being the result even when the blood taken away amounts to the twentieth part of the patient's weight. If, however, the bleeding be repeated, death may ensue in the course of a few hours. Bleedings equivalent to the thirtieth or fortieth of the weight of the body, may be repeated several times; and in this way, even though the animal be kept without food, a tenth or even an eighth of the whole weight may be abstracted by successive blood-lettings. If some food be given, the bleeding may be carried much farther; and if the animal continues to eat and drink, its weight will vary very little; blood being supplied apparently at the expense of the aliments, however small their quantity may be. The weight of the animals kept without food diminishes in proportion to the blood lost by them, which is more slowly reproduced in them than in those above-mentioned. On opening, some time after death, those dogs which did not die till several hours had elapsed after the bleeding, M. Piorry found coagulated fibrin in the right and left sides of the heart and the large veins. To ascertain whether these clots caused death, he opened immediately after death some dogs similarly situated; but no clots were found in the heart; whence he concludes that the loss of a large quantity of blood and the want of *hæmatosis* were the sole causes of death. However great the quantity of blood lost, much still remained at the centres of the circulation. M. Piorry remarked in one of the dogs preserved after the first experiments in boxes lined with straw, in consequence of the temperature being about 20° Fahr., —a phenomenon which he regards as extraordinary. The serum of the blood extracted next morning was absolutely like milk, while in the evening the blood drawn presented nothing peculiar. The cause of this M. Piorry could not ascertain, but throws out, in the form of an interrogation, the hint, that it might have been owing to the want of fresh air, from the box being firmly closed. We presume that the difficulty to M. Piorry is the remote cause. But we must observe, that he appears to be completely ignorant of the causes on which this appearance of the blood depends, as shown by various papers in this Journal.—(See Vol. vii. xvii. xix. xxxiii.)

M. Piorry next investigates the immediate effects of copious bleedings on different organs. In the digestive canal we have immediately indigestion, if the animals have taken food, and some minutes before death, contractions of the large intestines. If the hemorrhage be not mortal, there is want of appetite, and most frequently thirst. Some hours afterwards the animals drink much, but do not eat. The thirst is the consequence of the loss of blood, and not of any gastric or other irritation. The bladder generally contracts at the same time as the rectum. The pulsations of the heart and arteries become feeble and accelerated, in proportion as blood is abstracted. The contractions of the heart become afterwards intermittent, irregular, and insensible to the stethoscope and the hand, though the blood still flows from the open vessels. The heart, however, continues to beat and to throw the blood out forcibly, when the animal seems to have died from the hemorrhage, as appears when the heart is exposed. Derangement of the action of the heart is followed by disorder in the respiration, which becomes difficult and convulsive. Some moments before death the rattle comes on. Syncope occurs in dogs only when the bleeding is enormous, and becomes fatal if the hemorrhage be not stopped. Death is almost always preceded by tetanic contractions, and when the dog has lost much blood, his posteriors are as it were paralysed. The animal walks with difficulty, and attempts to support himself against the wall, by the assistance of which, if he reaches it, he is enabled to make some steps. The wounds of dogs which have sustained enormous bleedings heal rapidly both by the first and second intention. The force of muscular contraction does not correspond to the quantity of blood distributed to them; for dogs which had lost blood to a tenth of their weight performed vigorous motions, and the œsophagus could be galvanically excited twenty-four hours after death, even when it was separated from the animal, and did not consequently contain blood. That our organs may contract from defect of stimulus, M. Piorry infers to be proved, by the involuntary emission of urine and feces, and the tetanic convulsions taking place only when the animal was on the point of falling into syncope, and when, consequently, the bladder, rectum, and brain were not sufficiently stimulated. In hemorrhage the emission of urine, involuntary dejections, and convulsions, announce imminent and dangerous syncope, though it do not always prove mortal.

The changes produced in the circulation by bleeding do not increase in proportion as the hemorrhage is prolonged. Thus the prodigious and instantaneous weakening of the pulse, which occurred in some instances at the commencement of the first bleeding of several of the dogs, continued intense for an indefinite length of time without death ensuing. From this M. Piorry infers, that we ought not to desist from bleeding, because the first may occasion in certain individuals a rapid and sensible weakening of the circulation. In a number of cases which he met with at the Salpêtriere, the extreme smallness of the pulse when the heart was distended with blood did not prevent him from practising blood-lettings, which were attended with the happiest results.

Death which occurs after hemorrhage, during which the head of the animal has been kept low, will necessarily be sudden, and not preceded by syncope, being the consequence of the absolute want of blood. In other cases faintings may precede real death, because there may be found in the economy circulating fluids which may be carried back to the brain. Besides, death may occur in consequence of the instant stoppage of the course of blood to the brain, which probably takes place in certain cases of aneurism, or where the extreme dilatation of the heart deprives it of the power of carrying the liquid to the brain. On the other hand, a very small quantity of blood may support life, provided the nervous centres be supplied with it.

Convalescence from loss of blood takes place very rapidly, if the subject which has experienced it have a good appetite and good digestion; but it will be much slower if the aliments be not in sufficient quantity. From this it follows that, in diseases of the gastric or pulmonary organs, where *hæmatosis* is incomplete, we ought to be cautious in the use of blood-letting.

For a long time after great losses of blood the pulse is very rapid. This rapidity is owing to loss of blood, and not to local irritation.

2. *Of the influence of gravity on the circulation.*—It is almost impossible to kill a dog by opening one of his jugular veins, while his posteriors are depressed. Even if both jugulars be opened death will be produced with difficulty. If, however, the posteriors be placed on a level with the head, the blood flows immediately, and if the head be depressed it escapes still more rapidly. If the dog be returned to it first position the blood ceases to flow. If the head of a dog which has lost much blood be kept elevated, his posteriors and paws depressed and dependent, syncope supervenes. If, again, the posteriors be elevated, and the head depressed, animation is restored. If a dog, which appears to have perished from hemorrhage, with his extremities in their natural position, has within two or three minutes his posteriors raised or his head depressed, respiration will speedily be restored, the heart will contract sensibly, the head, which was hanging down, will be raised, the paws will sustain themselves, and cephalic action manifest itself. If, however, you leave in a state of apparent death the dog in its first position, it will seldom return to life. If all the parts of an animal revived, as above described, be placed in an opposite direction for some minutes syncope will supervene. The experiment, though dangerous, may be repeated a third or a fourth time.

M. Piorry has met with several instances of the same influence in man. The life of one woman who was in the agonies of death was prolonged for some hours by keeping the head low. A very interesting case in illustration of the same is narrated by the author in the second section of the paper which we are now examining. The explanation of these facts is obvious to the rational physician, who avails himself of them daily in the exercise of his art. The circulation may be going on in certain parts of the body in which it is favoured by gravity, and cease in others where it opposed by the same, and it is the absence or presence of blood in the vessels of the brain which produces or puts an end to syncope.

After citing several circumstances exhibiting the influence of gravity on the circulation, M Piorry notes the application which he has made of it.

Three cases of erysipelas of the lower extremities, and three of inflammatory swelling of the arm, in consequence of phlebitis, were speedily brought to a successful termination, by keeping the affected parts suspended or propped up above the level of the rest of the body. By following the same practice in inflammations of the extremities consequent on gunshot wounds, the swelling was often reduced in a night. Many other instances are given of the good effects of causing the patient to maintain that position which shall tend to withdraw the blood from the affected part.

3. *General considerations on syncope and cerebral congestion.* This division of the paper M. Piorry subdivides into three portions. In the first he investigates the causes of syncope—in the second he gives the means of forming a diagnosis between syncope and cerebral congestion—and in the third he discusses the treatment of syncope.

*M. Piorry combats the opinion, that *syncope* depends upon the suspension of the action of the heart. That it is owing to a want of cerebral excitement he conceives proved by the following facts. 1*st*, *Syncope* is produced by moral impressions, odours, the sight of a disagreeable object, all which can act only on the brain or organs of sense. 2*d*, It is seldom that the action of the heart ceases altogether in syncope. 3*d*, In hemorrhage the action of the brain is suspended before that of the heart. The heart beats feebly, it is true, but still long after the sensorial or locomotive actions of the brain have been suspended. It even beats when the animal has ceased to live, in consequenee of the hemorrhage, and its contractions can be detected by the ear, and even by the eye when the cavity of the chest is opened. 4*th*, If, when much blood has been lost, the head be kept elevated, syncope supervenes; but the heart still beats in such a manner that the inferior arteries continue to pulsate. It is from the brain then that *leipothymia* proceeds. 5*th*, If the head be depressed and the inferior extremities raised syncope ceases; the return of cerebral excitement puts an end to *leipothymia*. That the syncope produced by moral impressions or consequent upon certain sensations, is owing to deficient action of the brain, M. Piorry conceives to be proved, 1*st*, Because the symptoms are the same, and the identity of the phenomena leads us to admit the identity of the causes; and 2*d*, Because *leipothymia*, from moral causes, is cured by the same means as syncope from hemorrhage.

We pass over M. Piorry's refutation of Bichat's arguments to prove that the cause of syncope was in the heart. According to the author the following is the true account of the matter. The brain, or rather the cerebro-spinal system, suspends its influence over the heart, the beatings of which become less strong and less regular. Hence less blood is sent to the brain, there is less excitement, less influence over the heart, and a tendency to a continuance of *leipothymia*. But excite the brain by inclined posture the syncope ceases, and the beatings of the heart, which still continue, assume greater force and regularity. He believes with Bichat, that syncope following hemorrhage is caused by the brain not being stimulated by blood, but he does not believe that the heart ceases to act before the brain. The cause of death is deficiency of blood, and not deficient action of the heart.

We now come to M. Piorry's method of distinguishing *syncope* from cerebral congestion; a subject of great practical importance. He sets out with observing, that the excess and deficiency of the peculiar stimulus of an organ may produce the same effects. Of this he cites several examples. He then adverts to the points of resemblance between syncope and apoplexy, and shows that the state of the circulation is in general sufficient to enable the practitioner to distinguish the two diseases. In cerebral congestion the contractions of the heart are slow, strong, and easily analyzed; in syncope they are accelerated, feeble, and irregular. In apoplexy the pulse, especially of the arteries of the head, is in general full, vibrating, and slow; in syncope it is small quick, and compressible. The face, lips, and gums are rosy or red in apoplexy, but pale in syncope. In certain cases, however, the diagnosis is not so easy, as the circulation does not furnish such positive data. In these M. Piorry recommends us to avail ourselves of the information to be derived from placing the patient in the vertical or horizontal position as the case may be. If, upon the whole, we should be led to suppose that the patient labours under cerebral congestion, by placing him in a vertical position, the evil will be diminished, or at least not increased, if the diagnosis be correct. Of course, if the diagnosis be incorect, the symptoms will be aggravated. If, on the other hand, syncope be suspected, the patient is to be placed in a horizontal posture and the effects observed. The author, not without reason, recommends caution in putting this plan in execution, lest the patient be killed in the attempt to ascertain his disease.

In the treatment of syncope, M. Piorry depends chiefly on placing the head in a lower position than the trunk, and on elevation of the legs, thighs, pelvis, and arms. Thus all the venous blood of the economy is directed towards the brain. An important objection, however, here presents itself; the blood which reaches the right side of the heart is venous, and must be directed to the left side of the heart before it can reach the brain. But how can the low position of the head suddenly restore the patient to life when the respiration is suspended? To this M. Piorry replies, that facts are better than reasonings; that the facts he mentions are incontrovertible, and are, besides, in accordance with what we should expect. There always remains, even when syncope has been complete, a certain quantity of arterial blood in the left side of the heart and in the arteries. This column of liquid is not large enough in the state of *stasis* to be propelled to the brain, because it must be distributed through the arterial system. But, change the position as recommended above, and a considerable proportion of the nutrient liquid, carried towards the parts which are lowered, will stimulate the encephalon sufficiently to produce the first inspiratory movements, and after that, the successive portions of blood from the extremities reaching the heart, will experience the influence of the air and be carried to the brain and support life.

4. *On death by syncope and on phlebotomy.* According to M. Piorry's opinion death, by syncope, next to that caused by asphyxia from bronchial frothy mucus, is the most frequent. Severe hemorrhage, as from opening an artery, or an excessive diarrhœa causing an enormous loss of the circulating fluids, insufficient nourishment, grave organic lesions, as pulmonary tubercles, or cancer of the stomach preventing *hæmatosis*, and, in fine, over-distension of the heart, or its not receiving sufficient nervous influence to enable it to convey the blood towards the encephalon, may all produce death in consequence of their depriving the encephalon of its proper stimulus. In these different morbid states there are points of resemblance and difference. Death of the brain always takes place first, but there is a difference between the last moments in syncope rapidly produced and those in which it supervenes slowly. In the former case, the brain, which is vigorous and well nourished, suffers severely from the loss of its stimulus, and hence in great hemorrhages, the convulsions and contractions which precede death. In the latter, however the stimulus is slowly withdrawn, the organ, which is by degrees atrophied and enfeebled, is accustomed to this gradual diminution of stimulus, and no reaction ensues when it has reached its last term. It is thus that certain consumptive and cancerous patients perish without suffering, or cerebral affections. In syncope the loss of blood is either absolute or relative. In the first case the syncope can be cured only by introducing blood into the system; in the other it may be readily put an end to by causing the blood, which is distributed elsewhere, to reach the brain.

There is an anatomical difference between the death occasioned by syncope and that which follows the rattle. On opening the thorax the lung is found retracted, lying on its root, small and not crepitating, When the loss of blood is absolute the pulmonary parenchyma is pale, and its vessels small. When the loss of blood is relative, the vessels are distended, and the tissue of the lung coloured. In death from rapid cessation of nervous action, the respiratory organs may be collapsed, as in syncope in general, but they will contain blood, and be highly coloured, as in the cases where life is destroyed, not from want of blood, but from its not reaching the brain. Death, however, by nervous sideration, is very rare. It is said to occur from lightning and apoplexy of the annular protuberance, or the most elevated part of the spinal cord. Cerebral hemorrhage from any other point causes death with the rattle.

Death may be caused by deficiency of blood in the brain, though fluids appear in the sinuses on inspection, because life is supported, not by the fluid which remains in the encephalon, but by that which circulates there. The cerebral veins may be full when there is general anæmia, for the cranium forms a cavity into which the external air cannot penetrate, and the atmospheric pressure must retain the blood there, as otherwise a vacuum would be formed in the cranium. The venous blood cannot quit the sinuses without being driven on by the blood coming from the arteries, which does not take place in syncope.

Applying these facts to the employment of blood-letting, M. Piorry lays down the following rules. When the lung gives a dull sound on percussion *(presente de la matité)* with persistence of the respiratory murmur; when the heart is dilated, the liver voluminous, and the spleen large; when the veins are distended, the blood circulating in them rapidly, the pulse strong and full, the capillaries injected, the mucous membranes red and the muscles firm and large; then the quantity of blood is enormous, and a considerable portion may be drawn without fear. But if opposite symptoms announce *anæmia*, bleeding ought to be avoided, especially if deep organic lesions prevent the reparation of the fluid abstracted. Some of these characteristics, however, may be absent. The pulse may be weak, the external venous circulation difficult, and the capillaries pale, but if there be internal congestion there is blood which may be abstractted cautiously. The practitioner ought to avoid bleeding individuals whose integuments are coloured, but whose internal organs are in a state opposite to plethora. These individuals with a fresh and rosy tint, bear bleeding worse than dry lean pale-faced men. Blood ought not to be abstracted from a patient placed in such a position that his head is on a level with his trunk, for if syncope supervene we are deprived of the principal means of putting an end to it.

We pass over the rest of the section, which contains minute directions for the performance of phlebotomy, and for recovering a patient from syncope, if it should occur. We shall give M. Piorry's general conclusions.

1. Blood may be abstracted to the amount of several pounds, without danger, from an adult man whose gastric and pulmonary organs are sound. Neither dropsies nor other affections will follow. 2. The arterial, venous, and capillary circulations are in part under the laws of gravitation, especially in feeble subjects. 3. The cause of syncope is in the encephalon, the action of which is in this case diminished either from being not excited by the blood or from being directly enfeebled. 4. The state of the circulation furnishes us with the means of distinguishing syncope from apoplexy, but the horizontal or vertical attitude much more so. 5. The keeping the head lower than the rest of the body is the chief means for putting an end to syncope. 6. Finally, in bleeding, account must be taken of the influence of gravity on the course of the blood.

B. *On the venous circulation considered in reference to diagnosis.* M. Piorry, conceiving that an examination of the venous system might in some cases be useful in forming a diagnosis, has pointed out the mode of examining them, and the information which they are capable of communicating.

The following are the precautions to be used in examining the veins. The usual state of the veins of the patient must be ascertained. The examination must not be limited to one branch or one trunk, but several vessels of the same dimensions must be compared with each other. In examining the veins, in feeling or compressing them on any point, care must be taken not to modify at the same time unconsciously the circulation of the neighbouring branches. The surface of the body or of the part, the venous trunks of which are to be examined, ought to be of a medium temperature. If the temperature be too low the integuments will be contracted and the veins compressed, if too high the subcutaneous vessels will be unnaturally distended. In most of the examinations the horizontal posture ought to be assumed by the patient, and no exertion ought to have been previously made, which could at all modify the venous circulation. Before coming to any conclusions, the examination ought to be repeated, as it is easy to fall into error.

As we consider this to be a matter more of curiosity than of any practical importance, we shall content ourselves with briefly stating the author's deductions, referring to the work itself, such of our readers as may be anxious to obtain more minute information regarding the grounds of his conclusions.

1. By an examination of the veins, we may judge approxi-

mately of the quantity of blood contained in the circulatory apparatus, and consequently determine a *priori* the propriety of blood-letting.

2. By an examination of the veins, the colour, and consequently the nature of the blood may be ascertained. This, however, cannot be done in the large veins, especially those of the inferior extremities. The veins must be selected where the skin is thin, and principally on the back of the hand.

3. By an examination of the veins, the way in which the blood traverses the capillaries may be ascertained, and an approximate measurement made of the energy of the arterial circulation.

4. By an examination of the veins next the heart, an idea may be formed of the facility with which the blood reaches the right auricle.

C. *On the serum of the blood, and the formation of some accidental productions.* Want of room compels us to omit the experiments and observations, with a detail of which the commencement of this paper is occupied. We can afford space only for M. Piorry's deductions.

1. The serum of the blood and not the crassamentum, contains the elements of the inflammatory coat. 2. The pseudo-membrane of blisters, pleurisy, &c. is owing to the exhalation of serum containing this coat in solution. 3. Pus in many cases is only serum thickened by absorption. 4. Tubercles, scirrhus, &c. are perhaps owing to analogous circumstances. 5. The source of most anormal productions is the deposition of the elements of the blood in the cavities of organs, their formation in many cases not being the result of a transformation of tissue. 6. Membranous serum deposited, whether on the surface of the inflamed *pleura*, or on the *derma*, or on the mucous membrane in croup, or, in fine, in the cellules of an inflamed tissue, forms, when the more liquid parts have been absorbed, accidental membranes, the membrane of croup, and the infiltrations preceding abscesses. 7. If the crassamentum be mixed with the serum, the productions resulting from them will be differently coloured. 8. The length of time the membranous serum remains in the tissue will decide in part the formation of membranes, which may ultimately assume an apparent organization, because the serum is living.

Having thus laid before our readers a brief notice of the facts and conclusions published by M. Piorry regarding the circulation, we leave them to form their own opinions, begging to remark, that the facts themselves are valuable, notwithstanding that the author has frequently exaggerated their importance, and drawn from them too sweeping conclusions.

The remaining papers contained in the volume present nothing of sufficient importance to merit notice here.

ART. IV.—*Physiologie Végétale, ou exposition des Forces et des Functions vitales des Végétaux.—Vegetable Physiology, or an Exposition of the Vital Forces and Functions of Vegetables.* By M. AUG. PYR. DE CANDOLLE. 3 Vols. 8vo. Paris, 1832.

IN our last Number we gave a general account of the two first parts of Professor De Candolle's interesting work, those in which he treats of Vegetable Life in general, and its application to the Nutrition of Plants. We shall now proceed to the next division of his treatise, VEGETABLE REPRODUCTION.

It will readily be seen, that, on account of the absence of the powers of locomotion and consciousness, plants require more varied means of continuing their species than animals do. Those means may principally be referred to the production of grains, through the medium of organs bearing some resemblance in function to the sexual organs of animals; and to reproduction, by putting into the ground separate portions of the living vegetable, separated from the parent plant. Without pretending to those nice powers of discrimination, which an English lady mentioned by De Candolle fancied she possessed, of detecting, in the interior of stems, by the microscope, bouquets of flowers ready prepared, it is certain that *flowers* can often be discerned long before their actual appearance; and that the rudiments of some of them, as of many palms, are discoverable, for the different consecutive years at which they are to exhibit themselves, even as far as the seventh. The *period of flowering* varies much in plants, from the first year of their existence upwards; and is affected by various circumstances of soil and temperature; but when the growth is most vigorous, the disposition to flower is least so; and hence the various modes resorted to by horticulturists to promote the production of fruit; all of which tend to diminish the vigour of the plant. Melon plants have been made to bear, either by taking away a portion of the roots, or the outer covering of the stem, so as to retard or diminish the flow of sap; while in the East Indies, the roots of trees which are not productive are sometimes exposed to the air, so as to subject them to the influence of an artificial winter.

Marine plants are apt in gardens to have too much luxuriance; but this is checked by watering with salt water, which communicates less nutriment to them than fresh. A remarkable example of the same kind, we may observe, occurs in the management of the filbert, particularly in Kent, where luxuriant crops are solely produced by ample pruning.

Regularity in flowering is sometimes not established during the first years of a plant; and if fruit is left too long on trees, the flowering of the following year is materially affected, as in the olive and the apple, when the crops from this cause are sometimes only biennial. Hence the early producing trees, as the cherry and gooseberry, never fail having an annual crop. The flowering of plants is connected, in a considerable degree, with temperature; and Adanson attempted to come to some conclusions on the subject, by comparing the different amounts of daily temperature, from the 1st of January up to the time of flowering. According to this calculation he found, that the white poplar, at Paris, flowered when the daily accessory temperature amounted to 168 degrees of Reaumur's scale; the violet when they amounted to 272; the lilac when they amounted to 725; and the vine when they amounted to 1770. But such sort of calculations, De Candolle very correctly remarks, must be much affected by the unequal disposition to flowering, which the temperature of the previous autumn necessarily produces on different plants. The effects of temperature are likewise connected in an important degree with their mode of production, as by solar rays.

When the regular period of flowering is once established, it is difficult to change it; for fruit trees taken from temperate parts of the northern, to similar corresponding latitudes of the southern hemisphere, or the reverse, will for many years go on flowering at their original and accustomed periods; but there are occasional peculiarities or idiosyncrasies, as they may be called, which produce either a retardation or precocity in this process. Of the latter, the author gives examples in a horse-chesnut at Montpelier; in another at Geneva; and in a third near the statues of Hippomenes and Atalanta, at the Thuilleries, which were always a month earlier than their companions, though exposed to the same apparent external circumstances. The author suggests the perpetuation of such precocity, by graft.

There is much diversity among plants, in the *hour* of opening and shutting their flowers; but the phenomenon in all of these, is dependent principally on light; and when the nightshade was either exposed continually to the light of lamps, or to lamps at night, and obscurity during the day, the flowering became exceedingly irregular. The odour of some plants, such as the *Pelargonium*, *Gladiolus*, *Hesperis*, to which botanists have applied the trivial or specific name of *tristis*, is only exhaled at night; and a certain interesting change of colour exhibited by the *Hibiscus mutabilis* at Cuba, which is white in the morning, pale-red at mid-day, and bright red in the evening, did not take place when the thermometer happened to be at 19° Centigrade, or 11° below its usual standard of 30°,—which answer respectively to 67° and 86° of Fahrenheit's scale.

The fecundation of plants, which takes place by aspersion of a portion of male pollen on the female flower, has been known in the palm and date from the earliest periods; but it was not till towards the end of the 16th century that ideas began to be entertained as to sexes in plants; which, in 100 years subsequently became more fully established, and at length received the powerful confirmation of Linnæus himself. When, therefore, the author attributes the discovery of the sexes of plants to other persons than Linnæus, he considers himself as adhering to historical truth, and to the evidence of that great man himself, "who," says he, "is sufficiently rich in his own peculiar stores, not to require foreign appropriation to augment them."

In the fecundation of plants, the pollen is driven out from the anthers, and is carried, either by its weight, by the agitation of the air, or by insects, to the stigmas, which are covered with a viscous fluid for the purpose of retaining it. The pollen is lodged in two divisions of the anthers, which are sometimes subdivided into two more. It consists of minute globules, which are not attached to the anthers, at least in their maturity, and which are forced out, as some suppose, by the action of fibrous and very hygroscopic cells, placed in the covering of the anthers; or, according to others, by the desiccation, and consequent contraction of the epidermis of the anthers.

The globules are described, from the microscopic observations of Brogniart and others, as consisting of two membranes, the exterior of which gives way on touching the viscous fluid of the stigmas; and the interior, projecting through the opening, like a sort of hernia, forms a tube, which, insinuating itself between the cells, of which the stigma consists, conveys to the ovule the fluid, or *fovilla*, which the globules contain. This fluid is of an oily, viscous, and transparent nature, having particles floating in it, some of which, called *granules*, are of a regular size and form; but others, termed *molecules*, are irregular. All of them are, however, subject to a slow and irregular motion, the nature and cause of which has given rise to much speculation. Various discussions have likewise taken place with regard to the comparative extent of male and female influence in the fecundation of plants; but the author is of opinion, that the influence, as proved by the resemblance of plants in the hybrid tribe, to both parents, is mutual. Knight and Gaertner have, however, proved, that in such plants the disposition is greater to return to the female than the male character.

As a certain degree of *moisture* is necessary to enable the globules of the pollen to throw out their contents, the application of moisture, at any other period than when the pollen is to be applied to the female stigma, destroys its influence altogether. Hence the various means which nature adopts, for protecting the anthers from rain or dew, by shutting the flowers, or placing them under the shelter of leaves. But the most remarkable provisions are in the aquatic plants, where the pollen is continually liable to be thrown out prematurely. In some of them, as the *Zostera* or sea grass-wrack, the water *ranunculus*, the water plantain (*Alisma natans*,) and the whorled knotgrass (*Illecebrum verticillatum*,) a secretion of air takes place, in a doubling of the leaf, which contains the parts of fructification; and thus fecundation can take place, without the access of any portion of the fluid in which the plants live. In others which float on the surface, as the duck-weed (*Lemna*,) fecundation takes place in the open air; but when there are roots, as in the pond-weed (*Potamogeton*,) the *Carices*, and the bur-reed, (*Sparganium*,) the stalk elongates, so as to enable the plant to reach the surface at the proper period. The yellow and white water-lilies, which creep at the bottom of ponds, have peduncles, which project themselves so as to reach the surface of the water, without which the flowering would not take place. But the water aloe (*Stratiodes aloides*,) which grows at the bottom of water in its youth, is soon liberated, and floats on the surface during the greater part of its existence, by which means it is enabled to flower in the air. The water-chesnut (*Trapa natans*,) has a little bladder of air completed by the time of its flowering, which raises the flower to the surface, by expanding the coil with which its flower-stalk is provided. When fecundation has taken place, the air is absorbed or thrown off, and thus the plant sinks, and resumes its old position. But the bladder-worts have a still more remarkable mechanism. Connected with their singularly ramified leaves, they have numerous little bags, furnished with a lid or *operculum*, which ordinarily contain a little mucus, heavier than water, by means of which the plant is kept at the bottom. At the period of flowering, air is secreted, which, driving the mucus out at the operculum, supplies its place, and raises the plant to the surface. After the object has been answered, mucus is again secreted, the air is expelled, and the plant descends. In the *Aldrovanda*, the stalks, at a certain period, give way, and allow the flower to reach the surface, when, though deprived of roots, it lives sufficiently long to maturate its seed.

The most interesting instance, however, of this species of provision for the propagation of its species, is afforded by the *Valisneria*, which is a diœcious plant, living at the bottom of lakes in the south of Europe. The female flowers reach the surface at the proper period, by the evolution of a sort of corkscrew stalk, to which they are attached. The male flowers, on the other hand, are fixed by an inextensible stalk to the bottom; but they are contained in a sort of sheath, which, by rupturing, allows them to escape, when, by means of small vesicles attached to them, they ascend to the surface, where they float round the female, shed their pollen, and die. The female flowers, when fecundated, are gradually lowered down by the coiling up of the peduncle, and regain the bottom.

But though fecundation is the immediate function of flowers, and the anthers and stigmas are the peculiar organs by which it is effected, yet it may be readily supposed, that the other parts of the flower, which form the beautiful envelopes of those organs, are not merely ornamental.

They act as protections; but they likewise furnish carbon, and this, by uniting with the oxygen of the atmosphere, affords carbonic acid gas, which is absolutely necessary for the complete developement and formation of the perfect flower. The operation is in this way similar to what occurs in the leaves of plants; but often to double, and sometimes to triple, the extent. The immediate organs of reproduction exercise the faculty to a greater degree than the other parts of the flower; the male more than the female; and single flowers more than double.

The process is therefore, in fact, a species of combustion, from which a certain portion of heat is developed in most plants; and in some, as the *arum*, or wake-robin, to a very considerable degree.

It takes place only once on the expansion of each flower, and commences about three in the afternoon, is at its maximum at five, and ceases about seven in the evening. Sennebier found the temperature of the common arum rise about 16° Fahr. above that of the air; but the *Arum cordifolium*, in the Isle of France, when the ambient air was 74° of Fahr. raised the thermometer to 131°, and occasionally even so high as 142°.

The author next enters on the consideration of the *maturation of fruits and grains*, or what he terms the *gestation* of vegetables.

As soon as the embryo is fecundated, it acquires a particular species of life, and becomes a centre of action, attracting to itself the sap which was before devoted to the stamens, styles, and the other parts of the flower; just as in the animal creation, the blood receives a new direction to the fœtus. The supply of sap is much increased during the growth of fruit, as is known by orange trees freezing more readily in winter, when loaded with fruit, than when only bearing leaves; while the difference is strikingly marked on the side from which the fruit may have been taken, which has less sap than the other, and freezes with more difficulty.

The *period* which elapses between flowering and maturity, differs much in plants; and in some cases, seeds do not ripen till the second year, as in the juniper, the holly, the orange, and the cedar of Lebanon. Oranges, though they are considered as at their maturity at the end of the first year, will become much finer by being suffered to remain a second summer on the tree.

The *formation of fruit* arises from the peculiar nature of the envelopes which belong to the seeds. If the latter, like the pods of peas, have stomates, and exhale the superabundant water, they assume a membranous aspect; but if, on the other hand, the envelope does not possess stomates, and is therefore without the power of evaporation, the parenchyma, which lies between the two layers of which the envelope is formed, dilates, and a material, more or less solid, is produced in it, which constitutes the pulp, or flesh of fruits, from which man derives so important and agreeable a part of his aliment. It is in the cells of the parenchyma that the peculiar action takes place, on which the nature of the fruit depends; but of this action we are ignorant, and know as little why the citron should form an acid, or the orange a saccharine juice, as we do of the mode of production of animal secretions.

Saussure proved that fruits act on air as the leaves do; that is, they absorb oxygen during the night, which unites with the carbon of the vegetable, to form carbonic gas for their growth; while, during the day, and the action of the sun's rays, they disengage oxygen.

The *richness* of fruits depends on the proper elaboration of the sap, and to this heat is very favourable; but moisture, and the succulence which attends youth, are adverse. The *Cerealia*, which comprise the various kinds of grain, ripen after the stalk dries, and can transmit no more juice from the roots; and various fruits become more matured and saccharine after being withdrawn from the tree, merely by the action which goes on in the interior of their cells. By the process of *ripening*, water disappears, sugar is formed at the expence of the lignine, and of the gummy, mucilaginous, and other principles, which constitute the mass of the vegetable. The apricot, the gooseberry, and the cherry, have their water respectively diminished by maturation, from 89.39 parts in the 100, 86.41, and 88.28;—to 74.87, 81.10, and 74.85; while the sugar increases from 6.64, 0.52, and 1.12, to 16.48, 6.24, and 18.12. The various modes by which sugar can be artificially produced, particularly by the agency of heat, throw much light on these curious and obscure operations.

The *maturation of fruits* is occasionally assisted by slight injuries, which seem to act as stimulants to the local action of the parenchyma. Thus, when branches of the wild fig, in the islands of the Archipelago, are placed on those of the domestic, at the period of maturation, a small insect, the *Cynips psenes*, is communicated to the latter, which, by the punctures which it makes for the purpose of depositing its eggs, materially forwards the ripening process. This process is likewise assisted by puncturing the fruit with an awl, and putting a drop of oil on the part, for the purpose of preventing cicatrization.

Another curious mode of expediting the ripening of fruit, is by taking out a small portion of the bark, of an annular form, just after the period of fecundation, by which means the descending sap is retained, for a time, in the parts which surround the flower. Ringing has been devised in order to simplify the process.

The *maturation of grains* is conducted in a manner different from that of fruits. The immediate covering of the seed, or the *spermoderma*, as it has been called, becomes developed after fecundation, and has a fluid secreted into it, called the *amnios*, by which the embryo seed is at first nourished. The seed consists principally of a saccharine mucilage, which is in time modified into an oily or a pulpy mass, according to the nature of the plant; has its moisture entirely removed; and acquires, from the deposit of earthy and carbonaceous matter, a firm and solid texture. It is not that this change fits it the better for germination; for unripe grains will often germinate as well, and sometimes better than ripe ones; but they are thus rendered more imperishable, and less affected by the extremes of either heat or cold, than they would otherwise be. From the solidity thus acquired, arises the great specific gravity of seeds, which, from the coco-nut to the microscopic grains of the *Fuci*, have, with very few exceptions, and some of these more apparent than real, a greater specific gravity than water, and therefore sink in that fluid. This is often employed as a test of the soundness of seeds.

Seeds will often go on ripening, by the nourishment afforded by the parts to which the seed is attached, after separation from the parent stem. The nourishment, indeed, in the advanced period of maturity, is principally derived from the upper parts of the plant. At a more early period, the lower were mainly accessory in pumping up, and supporting the fruit and seed, and the nutriment which they communicated was obtained from the soil; hence, according to the opinion of the author, it is at the early period of the growth of the plant that the soil is most exhausted,—though it is considered by agriculturists that the maturation of grains attracts more nutriment, and exhausts the soil more, than the early growth.

This, however, seems to be certain, that though more may have been attributed to actual maturation than properly belongs to it, there is a particular period, perhaps just previous to the withering of the stem, up to which the exhausting process goes on in rather an increasing extent; for it is well known, that the *Cerealia*, and many green crops, which, when cut for fresh seed, will deteriorate the land but little, are found to have this effect to a great extent where the grains are allowed to advance to maturity.

After some observations on the mode by which plants are disseminated, and the best mode of preserving them, the author goes on to the consideration of *germination*, or the act by which an embryo grain quits the state of torpor in which it has hitherto existed, resumes its life, leaves its envelope, and sustains its existence to the time when its organs of nutriment are developed. When a seed is exposed to a certain degree of heat and moisture, it absorbs the latter, swells, breaks its covering, and projects by the opening a radicle, which directs itself to the earth, and pumps up nourishment. The *plumula* shoots out, and exposes the cotyledons, which dry up as soon as the primordial leaves are sufficiently developed; and thus germination is completed, and the plant begins to vegetate, pursuant to the ordinary law.

Water, *oxygen*, and *heat*, are all of them necessary for germination.

Of *water*, more than an equal weight is required. It acts principally by softening and dilating; but germination would not take place in boiled or distilled water, or in that which contains a solution of azote or carbonic acid; nor would it commence in an atmosphere of azote, hydrogen, or carbonic acid gas.

Oxygen is also required; and the proportion which answers best is nearly that which exists in atmospheric air. It has been seen to unite with the carbon of the plant, and to form carbonic acid gas, the seeds at the same time losing weight, and returning to the state in which they were before ripening. But it is a mistake to imagine that maturation is absolutely necessary to germination; it can take place long previously, and with equal effect as after it.

The degrees of temperature within which germination can take place are various; but sufficient attention has not been paid to the subject. It is known, however, that a temperature some degrees above the freezing point is necessary; and in the radish germination takes place between 41° and 100 of Fahrenheit.

With regard to the influence of *light* and *electricity*, not enough has yet been established to form accurate conclusions on the subject. The period when germination commences, and the time to which it is extended, is given in various tables; and some singular facts are stated as to its occurrence under various extraordinary circumstances. "Haricots and peas," says M. Lefébure, "have been often seen thrown out from the stomach and intestinal canal, in a state of germination. A person named Kesler reports, that a seed which had remained a long time in the external auditory meatus had put forth roots. It may be seen in a journal published by Vandermonde, that a child had a tumour in the right nostril, from which a pea was extracted, with twelve radicles." "These grains," adds M. De Candolle, "had found, in the specified cavities, all that was necessary for germination, to wit, air, moisture, appropriate temperature, and support."

Besides the continuation of the species by means of *seeds*, there is another mode of propagation, that by *division*. This is occasional in the lower animals, but very frequent in the vegetable creation; and it takes place either by means of the developement of the *ascending* or *descending* organs.

The bud is an example of propagation in the ascending organs; and of this there are many varieties. The potatoe is one of the most remarkable; and though it has generally been regarded as formed on the *roots* of the plant, it was proved by M. Dumal in 1813, and confirmed by M. Turpin, that this tubercle is actually produced on stalks, situate in the earth, though occasionally one or two may grow in the open air. In this case, however, they are of a green colour, and receive little growth. The tubercle contains two or more germs or buds called eyes, which, by separation, can become distinct plants, and in their turn produce crops of tubercles, just like the parent source. There are many plants which resemble the potatoe in this respect, and the formation of bulbs may also be regarded as a good deal analogous. Every bud, too, which shows itself on a living plant, may be regarded as the eye of a tubercle, which developes itself from the stem on which it appears. Sometimes buds are formed on leaves; and in the *Bryophyllum*, a plant which has fleshy and indented leaves in the angles of the indentations, there burst out buds which, when on the moist ground, or even under the influence of moist air, will shoot forth, first a *plumula*, and then a radicle, whether the leaf is attached to the plant or not. In these cases the leaves supply the necessary nourishment.

Offsets and *slips* afford examples of the multiplication of plants through the medium of *descending* organs, roots being first thrown out and then the leaves. But sometimes leaves themselves, when placed in the ground, will likewise take root;

of which the orange, the *Aucuba*, the *Ficus elastica*, and the fern afford examples.

Thus, as the author observes, we have, from time immemorial, divided and subdivided vines and sugar canes; we reproduce, without ceasing, new crops of potatoes, with eyes developed from preceding ones; and continually graft the buds of one fruit tree on other stocks. Even annual plants themselves, can, though with more difficulty, produce new shoots; and every stalk of a gramineous plant is the developement of a radicle bud. Davy has seen 128 stalks form from one grain of wheat; and 249 have been seen from one grain of barley. But the most remarkable example of this kind was furnished by Professor Miller of Cambridge. He sowed wheat on the 2d of June 1766. He divided the plant on the 8th of August into eighteen parts; then in October into sixty-seven parts, and in the spring following into 500 parts; and he reaped 21,109 heads, which produced 576,840 grains, and all of them from one alone.

In comparing the phenomena of reproduction by grains or division, it appears that grains are embryos of distinct beings; while division gives fragments only, which, however, are endowed with the faculty of entering into certain actions, by which they acquire a separate and independent existence. The duckweed (*Lemna*,) which floats on still water, exhibits an example of reproduction by both means. It is capable of flowering and fructifying in the usual way; but besides this, if one of its little discs is insulated in water, it will be found to throw out laterally, a small bud or tubercle, which increases horizontally, sends forth a little root, and forms a second disc resembling the original one, and united with it. In a similar manner a third is produced; and then the first separates, and forms a separate plant. In this way reproduction goes on, three only being adherent at any one time, till the whole surface is covered.

In carrying on reproduction, there are certain plants in which production by grains is hardly ever effected, as in the potatoe; though the seed, as well as the tubercles, will produce a prolific plant. The same also applies to various plants of the bulbous tribe. In the potatoe, the destruction of the tubercles will favour the growth and maturity of the flowers, and that of the flowers the tubercles; and hence it is probable that the plants will be most productive when there is little tendency to flowering. In many other plants, selections have been made of those which produce fewest seeds; and in some varieties of vine, and in the *Ananas* and bread-fruit, there are no seeds at all; and the whole nutriment of the plant, which would otherwise have been applied to the seeds, is therefore devoted to the fruit.

The author next goes on to the consideration of *species* and *their modifications.* The idea of species is connected with such a similarity among individuals, as is not incompatible with the supposition of their having come originally from the same stock; but there is sometimes, both in the animal and vegetable kingdom, as much difference between some individuals belonging to the same species, as between others belonging to different species. Thus, the Spanish and the Danish dog differ more than the dog and the wolf.

Many alterations of appearance are capable of being produced on plants by soil, temperature, and other external circumstances. But these can only be termed *variations*, and an alteration of such circumstances will restore the original form. When, however, the changes are such as are capable of being perpetuated in descent, they may be termed varieties and races. The production of white flowers instead of purple in the digitalis and poppy, or of double flowers instead of single ones, is a subject of great obscurity; but, like the spontaneous alterations of structure which are so often observed in animals, the seeds of plants, when once any deviations take place in the proper and original form of the individual from which they are derived, will many of them be able to continue the change. The permanence of species thus produced is proved by a great number of historical documents. Descriptions of plants are, to a certain degree, vague and deceptive among the more ancient authors; and so are likewise any representations of them which remain; but M. Mahudel, in the year 1716, recognized among Egyptian monuments several well-known plants; for instance, the *musa, nelumbo, colocasia,* and *persea*; and M. Bonastre has lately satisfied himself, both by designs and actual inspection, that more than eighty known plants are to be found in the remains of upper Egypt. M. Kunth, too, discovered above twenty of our plants among the fragments of vegetables found in the mummies of upper Egypt; and the author himself detected the leaves of the olive in a chaplet on a mummy; and grains of the *Triticum turgidum* on the cases of some of the mummies, which are considered as the most ancient.

Hybrid plants in the vegetable kingdom, like mules among animals, are such as are produced by the fecundation which takes place in consequence of the application of the pollen of one species to another.

The most material point connected with hybridity, is one which was not understood by Linnæus himself; namely, that a very near affinity is necessary between the species destined to fecundate each other, and the nearer this is, the more ready is the faculty of producing the hybrid, and the greater will be the fecundating power which it will possess. There are not, however, more than forty examples of natural hybridity; and those are among species of the same genus, and even section of the genus. The *anemone*, *ranunculus*, *narcissus*, *digitalis*, gentian, and mint, may be mentioned as some of the examples of plants capable of hybridity. As soon as a plant is once fecundated, which it can be with a very minute particle of pollen, no further action of pollen can take place; and hence the difficulty, in any experiments on artificial hybridity, to know when such previous fecundation has occurred. Hybrids are in a sort of intermediate state between the plants from which they are derived, and partake, without so much regularity as is observed in the mules of animals, of the character of both parents.

Hybrids are often more robust than their parents; but Lindley considers fertility as being limited to the third generation.

The formation of *varieties* in plants, is solely the production of seeds, and never occurs in those which are principally propagated by offsets. The author is disposed to refer it to a sort of hybridity, which may be diversified, and modified in various unknown ways, through a long succession, so as that the original stock may not be at all traceable. New varieties of the most common fruits, particularly apples and pears, are continually met with in various obscure situations, where they are propagated by offsets, and the less valuable varieties allowed to disappear.

The consideration of the infinite multiplication of plants, originally from the same individual, has induced some to conceive the possibility of plants being exhausted and dying of old age. Mr Knight applied this principle in attempting to account for the extraordinary mortality of the golden pippins in this country, within the last few years. But M. De Candolle feels it difficult, from an insulated fact, to admit a conclusion so different from what is warranted in all the other parts of the vegetable kingdom. He is inclined to think, that some atmospheric inclemency was destructive to this apple, just as was the case in 1816 with the palm trees; and about the year 1788 with the garden *gaillarda*, all of which perished at that time throughout France. He is the more disposed to refer this to the case of the golden pippin, from the climate of Great Britain being generally unfavourable to fruit.

Various changes of form in plants are capable of being perpetuated by divisions, which are too irregular to be regarded as varieties, and are too independent of external agencies to be considered as variations. These are termed *monstrosities*, and among the most common are double flowers and variegated leaves and fruits. That their production is dependent, in some degree, on some irregular action in fecundation, the author thinks probable; but does not feel justified in going farther in his speculations on the subject.

In animals it is observed, that similarities of appearance and structure are sometimes handed down to the progeny; but instead of being continued in direct succession will pass over a generation or two, and then exhibit themselves. This seems to be likewise the case to a certain extent with plants, and has been called *atavism* by MM. Duchesne and Sageret.

The reproduction of some of the *Cryptogamia*, is conducted in a manner similar to that which has been described as applying to the phanerogamous plants, namely, by fecundation, and the consequent production of seeds, and by division. But with regard to lichens, mushrooms, and *algæ*, nothing similar to parts of fructification has been discovered in any of them; and therefore their mode of fecundation is still an unascertained problem; but even with them propagation seems also to take place by means of certain external developements.

The partisans of spontaneous generation have derived their principal arguments from some of the *Cryptogamia*. But there are not now many supporters of this doctrine; for the extreme minuteness of the seeds in many of this tribe, gives them an opportunity of dissemination, far beyond the power of the senses to trace. It has likewise been found by Spallanzani and Sennebier, that when recently distilled water is put into a vessel hermetically sealed, no sort of developement of organic matter takes place in it.

The *general phenomena of vegetation which are common both to nutrition and reproduction*, now come under the author's consideration; and first he treats of vegetable abortions.

These the author, many years ago, proved to be much more frequent than was imagined to be the case; and to arise from a great variety of causes, operating principally during the period of fecundation. These he distinguishes into two general heads; 1*st*, whatever circumstances exercise restraint or compression on the organs of fructification; and, 2*d*, whatever diminishes the energy of the vital power, owing to some excess of it in neighbouring parts, or accidental injuries inflicted by insects.

The life of a tree is composed of actions simultaneously going on; and its general prosperity depends on a species of equilibrium between such actions. Too vigorous growth in one part, as the wood, for example, will prevent the successful advancement of the flowers; and art is often, by means of judicious pruning, very effectual in keeping up such equilibrium; hence it is, that fewer abortions take place in nursery grounds than in nature.

Certain changes called *degeneracies* or *metamorphoses*, consisting of various alterations of texture, colour, and direction, not unfrequently take place in plants. Grains are little subject to such changes, though some few are liable to become of a fleshy consistence, and bulbous appearance, so as to make it very difficult to ascertain their real character.

The power by which one part of a vegetable substance can unite with another, gives rise to the interesting system of *grafting*, which is so important in horticulture. In this process, the *liber*, and particularly the *alburnum* or *cambium*, are brought into junction, and unite, so as that the sap circulates up the fresh portion, and nourishes it. A different species of junction takes place through the medium of the juxtaposition of the cellular tissue, which is termed *soldering*; and it is in this simple way that most of the natural junctions are produced between different parts of the same plant, or of different plants. How it is effected is yet unknown; whether by some exudation of the juices shut up in the cells, which act as cements; or by a modification of the sap, meandering through the intercellular spaces.

When a graft is made, it derives its nourishment from the ascending sap, as may be known by coloured injections passing readily from the ligneous part of the plant to the graft. A certain anatomical and physiological analogy is necessary for successful grafting; and experience has shown, that plants alone which belong to the same natural family admit this process; and even with them, it is only where the analogy is most complete that it will succeed. Thus the grafts of the rose on the laurel or the holly; of the jasmine on the orange, of the orange on the pomegranate; and, in short, all the examples of the heterogeneous grafts mentioned both by ancients and moderns, have been founded in error. They have either been misconceptions, or pieces of charlatanism; with the exception, that parasitic plants form a real union with any tree to which they may be attached, however different in family. The misletoe unites with the woody substance, so as that coloured injections will pass from the one to the other.

Cherry stones may take root in the decayed parts of old trunks, and vegetate from them; and vines may seem to grow out of filbert trees, according to the ancients. But these are merely examples of juxtaposition, and not union. The most unexpected grafts are of the lilac on the ash; of the *chionanthus* on the ash and lilac; and of the olive on the ash and privet;—and they take place through some anatomical analogy, as they all belong to the family of the *Oléinéae*; but such unions do not last long.

Grafting, in all the various means by which it is effected, is exceedingly useful to man, in as much as it affords a ready means of augmenting the number of vegetables of every useful species or variety, and of preserving the modifications produced by hybridity. It sometimes affords a mode of ascertaining real affinities between plants, when this is ambiguous; and was ingeniously employed in 1811 by M. De Tschudy, at the suggestion of M. De Candolle, to determine the place of the *Hortensia*, with the *Hydrangea*, and not with the *Viburnum*, which many considered as its position. Attempts have likewise been made to transform diœcious into monœcious trees, by grafting male branches on female plants, or *vice versa*, in order to fecundate the fruit without the necessity of a second individual. Mr Knight has likewise employed grafts, in order to multiply the chances of hybridity, and thus to augment the varieties of fruit trees.

The direction of plants, as respecting their perpendicularity, and their habit of turning themselves towards the light, affords the subject of an interesting chapter. The descent of the roots, and ascent of the stems, is a faculty with which those two organs are respectively endowed, under whatever variety of circumstances they may be placed; and M. De Candolle is disposed to agree in the deductions made by Mr Knight from his experiments on the subject, and to refer those phenomena to gravitation.

The tendency of plants to direct themselves towards the light, has been referred by some to the necessity of freer exposure to air; but the fallacy of this opinion was shown by placing plants in a cellar, having two openings, one of which admitted air and not light; the other light and not air. The plants invariably directed themselves to the latter.

The mode in which M. De Candolle accounts for the phenomena is the following, as communicated by him many years ago to the *Societé d'Arcueil*.

When a young and green branch is exposed to light, the side most exposed decomposes carbonic acid gas, and fixes carbon in its tissue. Exhalation, too, is greater, and, consequently, the deposition of earthy matter; by both which means the solidity of that side is much increased, and the power of extension diminished. The other side, however, decomposes less carbonic acid gas, and fixes less carbon, has less exhalation, and deposits less earthy matter; hence its solidity is less, and extensibility greater; and as its fibres are elongated in a greater degree than on the illumined side, there is necessarily produced towards that side a curvature, which will be in the ratio of the inequality. The direction of plants to the light is therefore a particular example of the phenomena of *etiolation*; and that it is so, is further proved by the circumstance, that none but green plants, and those branches that are young, exhibit this tendency, while it is wanting in mushrooms, and such as are without colour.

The general fact of the tendency of one surface of a leaf to look upwards and the other downwards, is so inherent in the leaf, as to show itself on any change of direction, though kept up for some time by mechanical means.

In a chapter on the *motions* of plants, the author makes some observations on what has been termed, in somewhat poetical language, the *sleep of leaves.* This refers to several changes which take place during night in the positions of leaves, but which bear no analogy to sleep in animals, where there is always a degree of flaccidity and suppleness, instead of the rigidity which exists unchanged in vegetables during that period, and which will not bear any alteration of their position.

The author is of opinion that this phenomenon is to be attributed to the absence of light; for he found, that, when the sensitive plant was exposed to the bright light of lamps at night and to obscurity during the day, the alternation of opening and shutting the leaves became at first irregular, but in a few days was completely reversed; the leaves opening at night, and under the lamp light; and shutting in the morning with the commencement of obscurity. When the exposure was entirely either to light or darkness, the opening and shutting occurred at shorter intervals, and irregularly.

Some plants bear great elevations, and others great depressions of temperature, a circumstance which has been referred to a power of accommodation supposed to reside in plants somewhat similar to that which animals possess. The analogy is in some measure supported by the circumstance, that evaporation of water, and exhalation of oxygen by vegetables, produce cold, and fixation of carbon, heat.

The interior of trees preserves a more equable temperature than the ambient air; and it has been observed, that snow melts sooner at the foot of living than dead trees. The variations of temperature which the interior of the trunk of a tree exhibits, has been found to correspond with that of a thermometer placed four feet below the surface of the earth, that is, at the medium depth of the roots of the tree, which pump up into the interior of the trunk the moisture which the earth affords to them at that depth, and therefore produces the similarity of temperature mentioned.

With regard to colour, vegetables owe this principally to the action of solar light; for the membranous tissue of which they are composed is quite white. If kept from light, colour is not obtained, and the plant is etiolated; but the colour is not lost by removal from light, though the old leaves may wither, and fresh ones without colour may follow them.

Some plants are party-coloured; and in those, as well as the mushroom tribe, there is some unknown peculiarity which produces insusceptibility to colour in the whole or a part of the plant. Plants exhale oxygen and fix carbon by solar light; but that this is not the sole cause of colour is proved by the circumstance, that plants growing in bright lamp-light will acquire their proper green-colour, though they do not exhale oxygen. The production of the green colour seems to arise from the existence in the rounded cells of plants of a peculiar substance, to which M. De Candolle applies the denomination of *chromule*, and which, among other properties, possesses that of readily uniting with and fixing carbon, by the action of solar light. The green colour, M. De Candolle thinks, is owing to the mixture of carbon (which, like Indian ink, he considers as dark-blue rather than black,) with the tissue of the vegetable, which has always a yellow tinge. The action of light in producing colour, is probably that of a stimulus which determines the decomposition of the carbonic acid gas; but the action of heat may perhaps have in some degree the same effect; since, in a few plants, colour is produced, though at the bottom of the sea, and in deep mines.

The various modifications of colour which occur in vegetables, seem likely to arise from different degrees of oxygenization. Before a leaf withers, or undergoes a change of colour, it ceases to exhale oxygen if exposed to the sun, but continues to absorb it during the night; hence oxygen accumulates in it. The autumnal colours of fruits and leaves is therefore, on this principle, regarded as a morbid state, but one to which flowers, from their origin, bear some analogy.

Colours may be regarded as consisting of two series; one, in which yellow is the type, and which can pass through orange to red or white, but never to blue; the other, in which blue is the type, and which can pass through violet to red or white, but never to yellow. White seems to be only an extreme dilution, and black a great deepening of colour from yellow or blue.

When, therefore, the proper action of leaves goes on, the colour is green; but when oxygenization takes place to a great degree, a tendency to yellow and red is produced; and when, on the other hand, it occurs to a smaller degree, or with an increased deposition of carbon, the tendency is to blue and red. The colours of wood are very often special secretions, capable of being withdrawn by maceration in alcohol or acids.

After making some observations on the odours and flavours of vegetables, the author goes on to consider their comparative *tenacity* and *longevity*. The tenacity and consistence of wood is mainly attributable to the quantity of lignine which it contains, and not merely to the approximation of its ligneous fibres. The lignine itself may be modified in nature, and also by mixture with different materials, as *silica* and resinous juices. It is owing to the latter that the larch resists humidity better than any of the other European trees, and the cedar has been long celebrated for its duration; for the cedar gates of the cathedral of Constantinople, which were erected at the time of Constantine, were in existence during the Pontificate of Eugene IV. that is, 1100 years afterwards. The specific gravity of different woods varies materially. Thus a cubic foot of the service tree weighs 72 lb.; of the lilac 70 lb.; the oak 69 lb.; the larch 52 lb.; the ash 50 lb.; the cherry 47 lb.; the white poplar 38 lb.; the tulip tree 34 lb.; the Lombardy poplar 25 lb.

An interesting chapter treats of the *duration of trees*; and here there appears to be an important difference between the laws applicable to animal and vegetable life. Animals are bounded to a certain period of existence which cannot be far passed; but in vegetables there is no such limit. The operation of a great variety of causes may stop the growth or destroy the life of trees. Thus many decay from the effects of heat or cold, of moisture or dryness, of accidents from wind, and decay of the ruptured parts. But all these circumstances are extrinsic, and none of them are necessary to the individual, or are the result of old age, as in animals, where, at a certain period of life, the parts concerned in circulation and nourishment become hardened and obstructed, and are hence unable longer to support health and life. With regard to the growth of trees, it would appear, that the more common trees grow with some rapidity for the first 60 or 70 years, but that from that time their growth becomes diminished, though singularly regular even to the most advanced age.

There appears to be very good evidence of the high antiquity of many trees, whose age may be established, partly by historical documents and tradition, and partly by measurement of some of the successive layers of which they are composed. If a cleft is made in a tree and a portion of it taken out, the latest increase can readily be ascertained by inspection of the layers; while the earlier may be discovered with sufficient accuracy, by observations on younger trees of the same kind.

A lime tree was planted at Fribourg to celebrate the battle of Morat in 1476. It measured in 1831, 13 feet 9 inches in circumference. But there is one still more ancient, and which even at the time of this battle, was celebrated for its age and size. It measured 36 feet in circumference in 1831, when it was supposed to be 1230 years old,which gives 875 years for its age in 1476.

Another lime at Neustadt, in Wurtemburg, was supposed to be about 1140 years old; and in this country, the yews at Fountaine Abbey, at Crowhurst in Kent, and at Braburn in Kent, have been set down respectively as 1280, 1458, and 3000 years old. The Baobab of the Cape de Verd Islands, however, affords still higher presumptive proofs of longevity. It is called by the natives, the tree of 1000 years; and Adanson found an inscription, which was mentioned as having been made by some English traveller 300 years before, covered with 300 ligneous layers, from the amount of which, compared with the magnitude of the tree, as well as the growth of some young trees in its neighbourhood, he made out a table of comparative age and magnitude, and satisfied himself, that it could not be less than 6000 years old.

The power of *suspending the actions of life*, and of resuming them after a considerable lapse of time, is a phenomenon of which there are many examples in the vegetable kingdom; but the circumstances under which the suspension and revival of the signs of life take place are not referable to the robustness of the plant, or to any known laws. The grains of most species of corn may be dried and preserved for a long series of years; and will germinate on exposure to heat and moisture; and this even when germination had previously existed, and been checked. The seeds of the cress, cabbage, and mustard, have also the same property; while it is very much wanting in the bean, the pea, and the poppy. Bulbs which were found in the hands of Egyptian mummies have been stated to revive on planting them; but M. De Candolle thinks they must have been placed there subsequently to the removal of the mummies from the catacombs; for some grains of wheat which were taken from the cases of mummies, evinced no disposition to germinate, and were, in fact, found to have been subjected to a species of carbonization, similar to that of slow combustion.

Lichens and mosses have the same property of suspension to a remarkable extent. The latter, after the lapse of a hundred years, have assumed their original vigour, on immersion for seven or eight hours in cold water, and in the ancient *herbarium* of Dillenius at Oxford, examples have occurred of a similar kind, even after a period of double that extent. These phenomena of the vegetable bear some analogy to certain occurrences in the animal kingdom; for the *rotifer* or wheel animalcule, which lives in stagnant water, may be again and again dried, and kept for a long series of years in the form of dust, and yet be constantly revived on being exposed to moisture for a few minutes.

The system of *grafting* and of *propagating by slips*, constitute a sort of *transplanting* of a portion of a vegetable; but in removing entire plants from one place to another, it is necessary, either to convey them with the earth attached to the roots, and in this case, it is most easily effected when the earth around the roots is frozen, or with the filaments of the roots preserved entire; after the plan of Steuart, by which means ornamental trees of considerable magnitude may be made successfully to change their place.

Large trees may sometimes be removed by abridging judiciously their branches, so that the evaporation may not go on beyond the power of the roots to supply materials for it.

Vegetables have the power of throwing off by decay and death certain organs of high importance in their economy, as the leaves; and in this they differ much from animals, where the organs thus from time to time parted with, as the hair, the skin, feathers, horns or nails, are entirely accessory, and of little importance to life. The possession of *temperaments* and *idiosyncrasies* in vegetables, seems, as in animals, to be connected with some obscure operation of vital power.

In the fifth and last book, M. De Candolle treats of the *operation of external agents on vegetables* or *vegetable epirreology*, the Theory of Influences, (ἐπιῤῥοη *influxus*,) as he, in imitation of M. Picconi, terms it.

The effects of *light and heat* have often been descanted on in previous parts of his work; but here he observes, that light produces many of the effects which are usually attributed to air. Flavour and odour are peculiarly the results of exposure to light; and they are less developed in young than older productions, where the operation has been longer, and more effective. By favouring the approach of light, fruit is improved; and so is the hardness of wood, when this property is peculiarly required; but where the natural flavour is too powerful, as in the sea-cale and celery, blanching, by the removal of light, renders them softer and more palatable.

The general effects of heat on vegetables, and the various modes of increasing or diminishing it for practical purposes, have occupied much of the author's attention, and are treated of at some length. The smaller the quantity of water which a plant contains, and the more viscous are its juices, the greater is the power of resisting extremes of temperature. This likewise is the case, in the ratio of the air contained in the cellular structure of a vegetable, and of the difficulty which then is in the approach of atmospheric influence to the source of the sap in the roots.

With regard to *cold*, the power of resisting it is in proportion to the slowness of movement of the juices of the vegetable, and congelation takes place less readily in capillary tubes and vegetable cells of small than larger size. Hence minuteness of structure is itself a species of safeguard.

The atmosphere has a considerable influence on vegetation, both through the chemical agents of which it consists, and the substances which it holds in solution, particularly moisture, as well as by its physical and mechanical properties. Moderate winds, independently of their utility in purifying the atmosphere, and blending together the matters of which it consists, are important to vegetation, by the movement which they communicate, and the assistance which they thus afford to the circulation of the juices of the plant.

The difference in the *density* of the air is not the only circumstance which influences the vegetation of mountainous districts, compared with plains. The temperature is lower, in the ratio of 200 yards of absolute elevation for every degree of latitude. The action of light is also greater; and hence beauty of colour in mountain flowers, and the fine odour and flavour of their vegetables. More evaporation is likewise produced, and less oxygen absorbed, than in plains; and plants, which in hot countries can only occupy the summit of mountains, will, in the more temperate, live in the plains.

The important agency of *water* in promoting vegetation has already been treated of; and the natural watering of rain and dew far excels in advantage any artificial means of irrigation. Even aquatic plants feel the benefit of rain, which is considered as having a nutritive and exciting influence on vegetation, both as connected with the electric state of the atmosphere, and the possession of some foreign matter; for rain water is rarely found to be perfectly pure.

Many of the signs of rain, such as the white frost, the moisture on stones, and the halo round the moon, are merely indications of atmospheric humidity. The fall of the barometer has been found by Toaldo to indicate rain in about seven times in eleven.

Artificial watering ought to be given, so as to furnish the filaments of the roots with moisture, which are generally at the same distance from the trunk as the extremities of the branches. In France and Spain are some of the most successful examples of irrigation which Europe affords.

In addition to the usual modes of drainage when water is too abundant, may be mentioned the evaporation arising from living vegetables of quick growth, particularly the Lombardy poplar, which ought, for its full effect, to be succeeded by relays of new trees every fifteen or twenty years, planted in rows at moderate distances.

On the marshy banks of the Ohio, the *Helianthus* is cultivated as a means of carrying off moisture, and improving the salubrity of the region; for as each plant is supposed to exhale twenty ounces of water daily, and thus are planted very thick, the amount of evaporation from every square acre, must be exceedingly great.

The various *nature of soils* influences materially the process of vegetation; though it is difficult always to ascertain the precise principle of action. The differences depend principally on the composition of the soil, as consisting of mineral and vegetable substances; on its colour, which, when dark, renders it more readily heated by the rays of the sun; on its hygroscopicity, or power of acquiring or retaining humidity; but in particular, on its tenacity, which when too great, will not only prevent the developement of roots, but the access of air; and when too loose, will afford no sufficient basis for growth and nutrition.

The modes which nature adopts in her spontaneous, but never-ceasing efforts to increase the field of vegetable productions are interesting, and afford many useful lessons to the human race. "When a rock is exposed," says the author, "it happens in a longer or shorter time, either that its small fissures receive a portion of moisture, which frost serves further to open; or that the more soluble parts of it are attacked by moisture, which produces exfoliation and separation of the fragments; or that it is precipitated and broken by the action of the torrents; and that in this way, numerous causes, independent of vegetation, prepare rocks to furnish support to vegetable substances. Vegetation, however, soon co-operates. Lichens, whose imperceptible germs probably float in the air, develope themselves on the stony surface; they adhere to or sink into it, probably by the agency of some dissolving excretion. Their debris form, with those of the rock itself, a sort of earth, which nourishes lichens of larger size, and also mosses, and other analogous vegetables, which, when decayed, in their turn, serve to support more robust plants. These insinuate their roots into the smallest fissures of the rocks, deposit materials from which other vegetables arise, and tend, by their force of dilatation, to augment such fissures, and frequently to break enormous blocks themselves. From this spontaneous march of things it happens, that, setting aside certain very hard rocks, unfavourably placed, almost all that are exposed to the air are in time covered with vegetation; or by being divided into fragments, become gradually part of the vegetable soil."

The improvement of soils consists chiefly in the application of *labour*; in amendment; in manuring; and in the rotation of crops.

The object of *labour* is to enable the roots of vegetables to diffuse themselves freely, and the rain and dews to be readily imbibed; to allow water to evaporate; and to admit the atmosphere as much as possible through the surface. To these means must be added the destruction of weeds, the bringing new soil to the surface, the proper mingling of manure, and the placing of the soil in a favourable position with regard to water.

By means of amendments, endeavours are made to correct the natural defects of the soil; and the principal methods adopted for this purpose are the taking off or putting on of stones; the application of sands, clay, marl, lime, muriate of soda, muriate of lime, ashes, or gypsum, and the process of paring and burning. The conflict of opinions which exist as to the value of many of these processes, leads men continually to appeal to experience against theory; "as if," says M. De Candolle, "theory were any thing more, than the union and logical generalization of well-known and ascertained facts. People say that experience is every thing, but is it necessary that they should conduct their experiments on their own field, and not profit by the experience of others. To profit, however, by experience, it is necessary to appreciate the analogy, or the difference of circumstances; and this appreciation is a pure result of theory."

Manures comprise every sort of article which tends to augment the materials that serve for the nourishment of vegetables; and they are either *animal*, *vegetable*, or *mixt*.

Of the *animal*, some experiments made by Hermstaedt show, that the human excrement and urine, the excrement of the sheep and goat, and the dried blood of the ox, are all much alike in their power of fertilization; that the excrement of the cow and the pigeon is about a third less; and that earth not manured is three-fourths less. These experiments were made with twenty-five pounds of the respective materials, on portions of earth similarly worked, and planted with eight ounces of rye, barley, and oats.

The employment of liquid manures, particularly of urine, bullock's blood, and wash-house drainings, is much in use in Switzerland for pasture land. Columella and Palladius state, that fruit trees and the vine were much improved by such manure; and Mortimer assures us, that the rennets of Kent lost much of their value since the trees ceased to have this application made to them.

All vegetable substances when in a state of decomposition form good manure; and when mixed with animal and earthy matter, form the masses of compost, which are so valuable both to the farmer and horticulturist.

The precise operation of manures is a matter of difficult inquiry. Azote and carbon are afforded largely by them; and we have seen that the former enters into the composition of many vegetables, and particularly the *Cerealia*; while the latter, by an easy transition, is converted into carbonic acid gas, which occupies so important a place in vegetable nutrition.

The system of *rotation of crops* has led the author to some interesting views on the subject of vegetable physiology, which seem to require, however, considerable additional observations and experiments for their complete establishment. In the early periods of agriculture, population was scanty, and ground unlimited; so that land was sown and not again had recourse to for a great number of years, when a part of the preparation for another crop, was the *paring and burning*, which is still in some places in use. This was followed by *fallowing*, which the Romans adopted in order to recruit their land, and prepare it for fresh produce, and that by the present improved system of husbandry, in which the productive powers of land are kept up by a proper succession or *rotation of crops.* We owe this in a considerable degree to the Netherlands; and the four-course system, which is so much in use in the best cultivated parts of England and Scotland, is stated to have been indigenous from the most ancient periods in the valley of Morsine in Chablais.

By the continuance of production, land becomes speedily exhausted of its nutritive materials, and incapable of supplying the necessary pabulum for farther crops.

But, independent of this general effect of vegetation, it has been found that the ground which will no longer grow the same vegetable products will succeed in supporting others; and hence M. De Candolle is disposed to infer, that there is something thrown out from the roots of plants of an injurious nature, both to individuals of the same species and to those of species analogous in their organization. But though he considers this as more or less holding good with all plants, and as therefore rendering change of ground continually necessary, yet there are certain vegetable substances, possessed of mild and bland juices, which excrete from their roots fluids proper for ameliorating the ground for other vegetables; and such may be considered leguminous plants in reference to the gramineous. On the other hand, there are some plants, as the poppy and *Euphorbium*, which deteriorate the ground for most other vegetables.

Fruit trees, likewise, will not flourish when planted in the site of former trees of a similar nature; though the continual expansion of their roots, and their exposure to the influence of fresh soil, will prevent any injury from the deleterious excretions thrown out from them. Considerable attention has been deservedly paid to the important views of the author on this subject; but, in order to account for the same ground not being able to grow repeated crops of the same vegetable with advantage, it does not seem absolutely necessary that there should be any excretion of deleterious matter concerned in the phenomenon,—a circumstance which is extremely difficult to be proved. It would be quite sufficient to suppose, that certain materials demanded for the support of the plant were exhausted, and required a certain period, and the adoption of certain means, for their renewal.

The necessity of a certain rotation in every description of crop for healthy and flourishing vegetation, seems to apply in forests as well as cultivated ground. When large trees are cut down or decay, smaller ones, probably of a different kind, spring up, which encourage the slower growing, and in time give place to them, making, by slow and imperceptible degrees, a spontaneous and natural alteration, and renewal of all the parts of a forest. The destruction of many forests seems to the author to have been produced by overlooking this circumstance, and by an endeavour to keep up continually the growth of the same description of wood. Louis XIV. prohibited the grubbing up old forests, and therefore obliged their proprietors to preserve them in their original sites; but this was an injudicious and unfavourable measure; the most proper and provident being, from time to time, to do away with old woods and plant new ones on ground little adapted for other purposes.

The influence produced on vegetables by *mechanical causes* leads the author to examine the effects of wounds and of compressions and contusions on vegetables, with the best mode of obviating them. In the lopping of branches, and in pruning, man inflicts voluntary injuries for certain useful purposes. The main object of the latter operation is to preserve or produce an equilibrium between the parts of the trees which bear and those which do not bear fruit, and to have a regular distribution of sap on all sides.

With regard to the effect of poisonous substances on plants, it would appear, from a long enumeration made by the author, that almost all substances which are poisonous to animals are also poisonous to vegetables; but that some matters which are innocuous to the former are injurious to the latter. A singular analogy exists between the injuries which poisonous serpents are able to inflict on themselves by their fangs, though the poison is harmless in the place where it is secreted, and that which takes place with some vegetables, as the nettle, which, it is stated, may be destroyed by the application of its own poison to the roots of the plant.

An interesting chapter is given on the influence *which animals of various kinds* exercise on vegetables; another on the influence of *parasitic plants*; and a third on that which plants exercise *on each other* in various ways.

The processes by which the connection between the animal and vegetable kingdoms is preserved are well described by the author in the following terms.

> "Death, sooner or later," says he, "takes from animals the means of resisting external bodies; and the materials of which they are composed return to inanimate matter, decomposable by the simple forces of chemistry. These materials dissolve, are decomposed in the ground, and serve as manure more or less active. Every one knows this effect with regard to the larger animals; but the same improvement of soil is exercised in various degrees by

animals of all classes. It has even been observed, that water which contains microscopic animals is more favourable to vegetation than water which is without them. And the animals which, during their lives, were often the most formidable enemies to plants, finish, at their death, by giving back to them, under the form of manure, a part of the nourishment which they received. The equilibrium thus established between the two organic kingdoms, which renders them reciprocally useful to each other, is one of the most curious subjects of meditation. We have already seen that animal respiration furnishes carbonic acid, which is useful to vegetation; while vegetable respiration furnishes oxygen gas, which is necessary to animals.

"We have observed, that animals draw largely from vegetables for their food and all their other wants; but it is also apparent, that by their various excretions during life, and their decomposition after death, they furnish elements essential to the nutrition of plants. So that, though it might be easy to conceive the existence of the vegetable kingdom without the presence of any animal; and impossible, perhaps, to comprehend that of an animal kingdom without the presence of any vegetable, yet it must be confessed, that these two great classes of beings render mutual services to each other, and concur powerfully in maintaining the equilibrium of the universe."

Our limited space compels us to conclude with this passage our account of the work of M. De Candolle. Though that account has been necessarily lengthened, we have found it difficult to do justice to the work. M. De Candolle has the merit of entering into the extensive and complicated subject of the Physiology of Plants with the minuteness and accuracy, with which it deserves to be treated. The system of Willdenow, was the only one which gave any thing like a philosophical view of the facts and general principles of vegetable physiology; but in the lapse of seventeen years, that view has naturally fallen behind the progress of science. The chasm was ably supplied by Mr Ellis, in his excellent article on Vegetable Physiology, in the Supplement to the Encyclopædia Britannica, which is perhaps at the present moment the most instructive view upon a small and succinct scale. The narrow limits, however, within which such a view is necessarily circumscribed, renders it less comprehensive and less satisfactory on certain subjects than the reader requires. The present work is the only one which gives a view of the subject corresponding, both in extent and accuracy, to the progress of botanical knowledge, and the collateral branches of science.

We are happy to learn that one of the Royal medals has been awarded to Professor De Candolle by the Royal Society, for his discoveries and investigations in vegetable physiology.

Art. V.—*Observations on the Causes and Treatment of Ulcerous Diseases of the Leg.* By J. C. Spender, Member of the Royal College of Surgeons, London. 8vo. London, 1835. Pp. xi and 220.

This is the work of one who has enjoyed ample opportunities of studying the affections of which he treats, and who brings to the task powers of observation and reflection of no common order. From the preface we learn, that, during the last five years, about a thousand cases of ulcerous diseases of the leg had fallen under the author's observation and treatment, and that the work is the result of those observations and reflections which were forced upon him by his daily experience. From many authors and practitioners of celebrity he differs; but in doing so, he always takes care to state his reasons, and, while he claims the right to interpret nature and think for himself, he never fails to do justice to the merits, and treat with respect the opinions of others.

The work consists of a preface, in which the author enters into a long, and, what may be considered to be an unnecessary, justification of his publishing,—and four chapters, comprehending, 1*st*, remarks on the causes and classification of ulcers of the leg; 2*d*, the general principles of the treatment of these affections; 3*d*, the application of these general principles to particular cases; and 4*th*, remarks on the propriety and safety of healing ulcers of the leg. To the first three of these we beg to direct the attention of our readers.

It is usually said that legs suffer from ulcerous diseases, more frequently than other parts of the body, on account of their dependent position, and their remoteness from the centre of the circulation. To this explanation Mr Spender ingeniously objects, that, both the direction and the position of the parts are natural conditions, and cannot be accounted causes of disease, unless we be prepared to assert, that the tendency of the structures is to evil. He produces, however, a more tenable objection than this. If it were true that there is a tendency to ulceration in the leg, how comes it to pass, that the same accidents do not produce ulcers in all individuals of the same age and constitution; or, what is more to the point, how does it happen that an individual shall receive an injury in the same part of both legs at the same time, which shall produce a troublesome sore in the one, while the other shall recover as fast as any other part of the body would, if similarly affected. Were the received opinion true, they ought both to have been affected in the same way, but this is not the case, and therefore some other explanation must be sought for. This, according to the author, is to be found in the existence of a positive and palpable unhealthiness of the superficial structures of the limb. He does not assert that this is the only cause, for he admits that constitutional disturbance and violence may produce the affections alluded to. He maintains, however, that the former causes a general and not a local effect, and that ulcers occasioned by it might have exhibited themselves on any other part of the body as well as the legs, while from the latter, sound healthy legs recover as fast as any other parts of the body. We quote the author's description of the circumstances which contribute to explain the frequency of ulcerous diseases of the legs. These are two.

" 1. One cause arises from the manner in which the inferior extremities are exposed to injuries from external violence, by the infliction of blows and from the effects of falls. The consequence is, that the legs suffer from accidents in the form of contusions and wounds to a greater extent than the arms or other parts of the body. This is more remarkably the case in men than in women; and, for the same reason, in a higher degree amongst those men who are employed in laborious and mechanical occupations. But although the lower limbs are in this way the most liable to injuries, yet, from the commonly trifling nature of these accidents, this alone would be a matter of little importance, were it not for some peculiar conditions frequently connected with the extremities themselves. Every one must have observed that slight wounds or cuts of the leg are often more unmanageable than even greater injuries of the same kind occurring on other parts of the surface of the body, and much more apt to run into painful and troublesome sores. It is, indeed, to solve this fact, that recourse has usually been had to the explanation derived from the position or situation of the limb; for when writers on surgery assign these conditions of the extremity as the causes which account for the obstinacy of ulcers on the leg, it is not that they overlook the origin of many wounds from external violence, but that they then more particularly refer to their refractory nature.

" 2. This, in a great majority of instances arises, I think, from the other cause which remains to be mentioned. It is a positive and palpable unhealthiness in the outer structures of the leg, consisting of a varicose state of the superficial veins, either alone or combined with adventitious deposits, which are most generally the products of such varicose state.

" Perhaps, however, it will be said, even conceding the truth of this opinion, that the varicose affection itself results from the dependent position of the limb, and its remoteness from the heart, and therefore the tendency to ulcers arising from its existence should still be referred back to those anterior causes. But to this it is to be replied, that since we have already disposed of the doctrine of any original liability to disease in the legs more than in other parts of the body; in order to bring about this unhealthy condition of the veins, some mechanical interruption to the flow of blood, or some disease or weakness in the tunics of the vessel must be present; and it is to these impediments, whatever they may be, and not to any presumed natural tendencies, that the varicose state should be imputed. If it were merely from the dependent situation of the limb, or its distance from the centre of the circulation, that the veins become varicose, all legs ought to be varicose, for all legs hang down, and all legs are far away from the heart. So far, however, from this being true, we not uncommonly find that, even in the same individual, one extremity is varicose and the other not." —Pp. 5-7.

Mr Spender comprehends all the circumstances which may give rise to varicose affections under two classes. The first includes those obstacles or impediments which act on the track of the vein from without; and the second, every state of disease weakening the vein from within. All that the locality and direction of the leg do, is to render it more susceptible of the evil influence of those agents just mentioned, and to perpetuate any diseased action which may have already commenced. It is the combination of all these which renders varicose veins so frequent in the lower extremities compared with the upper.

That the legs are subject to a depraved character of their superficial structure, the author considers to be proved by the following circumstances. As the blood rises against gravity, and the veins have a tendency to dilate themselves when any unequal pressure is exercised on their track, or when the coats are any way weakened, the blood accumulates in the tubes, which are consequently expanded. This expansion weakens the veins, and the blood in consequence flows still more slowly. The affected vein becomes elongated as well as stretched, in consequence of its taking a winding or tortuous course, and the evil is aggravated by each turning presenting an additional obstacle to the progress of its contents. The sides, besides, being separated from each other, it becomes too wide for the valves to meet, which, there is reason to believe, are sometimes ruptured. Thus their advantage is lost,—the vein is converted into one long tube instead of a chain of shorter ones,—and the column of blood increased in weight when the tube is least able to sustain its pressure. To all this is sometimes superadded the formation of coagula, which, though not sufficient to plug up the vein entirely, obstruct still farther the course of the blood. Various morbid states follow this varicose state of the veins. The coats are sometimes ruptured, and considerable hemorrhage is the consequence. The cause of rupture is not so much the mechanical effects of its contents on the vessel as an ulcerative process, the result of an inflammatory action in the vessel and integuments covering it, produced by the irritation of the distension, or the presence of a clot of blood. Instead, however, of bursting, the disease occasionally proceeds in a more insidious manner. The texture of the skin is slowly altered, becoming sometimes extremely thin, at other times thick and spongy. By the former state, the irritable sore is most frequently accompanied; by the latter, the indolent.

Adventitious substances, more or less fluid, are the frequent consequences of the varicose affection. The more fluid are seated chiefly in the cellular substance, the more solid resemble the interstitial deposition in the dermoid structures. These are frequently generated to such an extent, that the varicose veins are completely obscured, so that the origin of the affection can be ascertained only by the history of the case and the absence of dropsical symptoms. They generally accompany more or less the indolent sore, and frequently are almost entirely absent in the irritable ulcer. These conditions of the integuments occasionally lead very rapidly to the introduction of a spontaneous sore, in other cases they continue stationary, till some trifling accident rouses them to action.

Mr Spender then proceeds to point out the way in which a varicose state of the veins leads to ulceration, or perpetuates it when produced by an external cause. The obstruction of the veins impedes the circulation in the capillaries, which sometimes become so overloaded that, to relieve themselves, they pour out part of their contents in the form of adventitious deposits, while the functions of the absorbents are at the same time, in consequence, so interfered with, that they do not entirely take them up. The powers of the circulation in the capillaries being thus enfeebled by obstructions in the veins and adventitious deposits, the vitality of the parts depending on them for nutriment is so lowered that they cannot resist the effects of the slightest injury, and sometimes even spontaneously ulcerate. The same cause also prevents the restorative process from repairing the effects of ulceration when it has once taken place.

In proving that a varicose state of the veins causing this deviation from health in the superficial structures of the limb exists to a degree and extent sufficient to explain the frequency of ulcerous affections of the legs, Mr Spender takes occasion to examine the opinion of Mr B. Bell, that varicose veins occur as a symptom of the callous ulcer, and are occasioned principally by the callosity producing a stricture in the course of the different veins. His objections are, that the ulcer follows the unhealthy state of the vessels, and therefore cannot produce it; that the same unhealthy state of the veins is found in other kinds of ulcers where no callosities exist to constrict the vessels, and even when the leg does not ulcerate at all; and that sores are found with thick callous edges unaccompanied by varicose veins. He admits that in some instances the callosities may increase the varicose affection, but this is very different from producing it. Other circumstances besides those mentioned militate against the correctness of Mr B. Bell's views. Well adjusted and powerful compression of the limb will, by its support, restore so far the natural action of the circulation, and, in proportion as this takes place, the state of the ulcer will improve, but the mere removal of callosities by caustic will not ameliorate the conditions of the veins.

Varicose veins precede and accompany the irritable as well as the callous indolent ulcer,—a circumstance by no means difficult to explain. The same disturbing cause will produce different effects according to the state of the constitution and seat of the disease. In all kinds of severe and refractory sores of the legs, Mr Spender has found the varicose affection existing in a greater or less degree, and some of the worst cases of this disease of the veins have been accompanied by the irritable ulcer. The state of the constitution and the local causes determine the species of ulcer. In the strong, the young, and the healthy, especially men, the ulcer is generally of the irritable character, in those advanced in years, in the weak and in females, it is more apt to assume the indolent form. The indolent ulcer is situated more deeply than the irritable one, the former attacking the integuments and cellular texture below, while the latter is confined to the vascular tissues of the skin itself. That the varicose condition of the veins ought to be reckoned the cause of the irritable as well as of the indolent ulcer appears from what takes place in the treatment of both affections. If, during the progress of the cure, the veins be deprived of their artificial support, by discontinuing or diminishing the pressure, the healing process of the ulcer, whether indolent or irritable, will be arrested, but if the proper degree of compression be again had recourse to, the recovery will proceed. On other occasions, after an ulcer has been so far improved that it will not fall back though the pressure be removed, another portion of the skin will become affected, and this occurs more frequently in the irritable than the indolent species. This is not owing to any particular condition of the skin, because if it were so, it ought to have appeared before, but to the part being sufficiently healed to resist the influence of the varicose state of the veins, which continues to be exerted in exciting ulceration in another part, the vitality of which is now lower than the surface restored. The opinion, that both kinds of ulceration are derived from the same origin, is strengthened by the circumstance, that some irritable ulcers are removed with difficulty by the use of local remedies only, while indolent sores readily disappear under the employment of compression, which the author has found to produce the same beneficial effects on both forms of the disease. The one species, moreover, is apt to pass into the other. The indolent species, from unusual exercise or general constitutional disturbance, will become irritable, but on the removal of the cause will speedily resume its former condition, while those ulcers which are irritable at the beginning, generally become indolent in the course of time. This, Mr Spender thinks, sometimes arises from the ulcer becoming deeper according to what has already been mentioned, as one of the characteristics of the indolent ulcers. The two remaining proofs which the author brings forward in support of his doctrine are, that children and young persons are remarkably free from varicose veins; that though their legs are continually sustaining injuries, yet such accidents generally do well by themselves; and that when a young person labours under an intractable ulcer, it will generally be found to be owing to some disease of the bone, or unhealthy condition of the system. Moreover, if an individual in good health receive a cut or wound on the leg, it will heal as readily as a similar accident in any other situation, if the superficial structures of the part be healthy, while if these be diseased the slightest scratch wi llproduce an ulcer.

Mr Spender, however, does not depend on reasoning altogether for the establishment of his views. He takes his stand upon the facts with which his experience has furnished him. He has traced the history and carefully examined the appearances of several hundred cases of ulcerated legs, both of the irritable and indolent kind, and has been astonished to find how frequently the varicose affection precedes and perpetuates the local evil. Out of a hundred cases, he found 79 varicose, consisting of 41 simple, 27 very irritable, 11 very indolent; 21 non-varicose, consisting of 15 simple, 4 very irritable, 2 very indolent; of the whole number 68 were females, and 32 males; of the 79 varicose, 59 were females, and 20 males; of the 21 non-varicose, 9 were females, and 12 males.

The varicose sore has been recognized as a species by many writers; but it has never been viewed as the best foundation on which a practical classification of ulcerous diseases of the legs can be built. This may be accounted for by the varicose state being sometimes obscured by œdematous swellings or thickenings of the integuments, and by its being altogether overlooked when not rendered conspicuous by the size and colour of the veins. The principal reason, however, why the varicose affection has not been sufficiently attended to, is the frequency of ulcerated legs being accounted for by the plausible but fallacious explanation which refers them to the dependent portion of the limb and its remoteness from the heart.

Mr Spender's next task is to show that his opinions are new, and that, though various writers and practitioners have had partial glimpses of the truth, not one of them saw the whole, or how far it ought to influence the classification and treatment of the affections which he is discussing. For this purpose he examines the opinion expressed by Wiseman, Mr B. Bell, Mr Baynton, Dr Underwood, Mr Whately, and Sir E. Home, and shows at considerable length the difference between his views and theirs.

In addition to the two leading causes of ulcerous affection of the legs above mentioned, there are others which produce these sores in them as well as in the rest of the body. These are, general weakness of the structures in old and feeble patients, œdematous and other swellings of the legs, and many eruptive diseases. Mr Spender, however, asserts, that many of the last mentioned depend upon a varicose state of the vessels, in support of which he brings forward several arguments. Sometimes the ulcer itself seems to produce the enlargement. This appears to result from the concurrence of two circumstances,—from the excitement of the parts terminating in effusion, and from the fluid not being readily absorbed, in consequence, perhaps, of the continuity of the lymphatics being destroyed by the ulceration of the surface. Whatever, however, be the cause, this enlargement exercises considerable influence over the recovery, and till it be induced no local application will have any effect, on account of its reducing the superficial structures of the limb below their usual vitality.

Besides the sores already mentioned, the legs are liable to phlegmonous erysipelatous and specific ulcers.

Mr Spender next gives his views of the classification of ulcerous affections of the legs.

" All ulcerous diseases of the legs appear to admit of a very easy and natural arrangement, into general and local; and, accordingly, this has been adopted by almost every writer. The first, or constitutional class, is subdivded in conformity to the nature of the diseases from which the sores arise—as venereal, scrofulous, and the like. The subdivisions of the second or local class, instead of being derived, as is usually the case, from the mere external aspect of the ulcers, should, I think, be taken from the more important and permanent distinction, arising from the presence or absence of varicose state.

"All sores of this class may therefore be arranged under two orders, determinable by the condition of the veins—first, varicose; second, non-varicose. Under each of these orders, may be retained the species or distinctions arising from the superficial appearance and character of the ulcer, according to the threefold degree of action exhibited,—irritable, simple, indolent. Thus we should have varicose irritable, varicose simple, and varicose indolent; and non-varicose irritable, non-varicose simple, and non-varicose indolent. The two general classes may be farther considered as separate or combined, according as the specific sore takes place, on a varicose or non-varicose limb; giving, for instance, venereal varicose, venereal non-varicose, each possessing its threefold degree of activity; and so of the rest. The object of such a classification is to make the presence or absence of the varicose affection one of the leading foundations on which the whole is built; as being the element of the greatest practical importance. When I have observed this simple distinction in practice, I have in general found that it is comparatively of little consequence whether the superficial aspect of the ulcer be what is termed irritable or indolent, exuberant, or callous. An attention to the varicose condition of the veins when present has, with nearly equal facility, removed each variety of ulcer, by the use of the same form of application hereafter described; whilst, on the contrary, the same application to the same kind of ulcer, so far as its mere external appearance is concerned, varies in its effect, just in proportion as it depends on the varicose state, unless great attention be directed to this constituent of the disease. Nothing can be clearer, therefore, that this last characteristic furnishes a much surer ground for a practical arrangement of ulcers, than the former, or rather, that the former affords none at all."

The remainder of this portion of the treatise is taken up with objections to other classifications, with which we do not think it necessary to trouble our readers. We proceed accordingly to examine the second and third chapters, containing Mr Spender's views of the general principles of the treatment of ulcerous affections of the leg, and their applications to particular cases.

When the efforts of nature are adequate to remove a disease, the principle of treatment will consist in imitating the natural process, but when these efforts are unavailing, a healthy action must be induced, to enable the system to overcome the evil. On these two principles the author proceeds.

The treatment of the exposed surface consists in imitating the process by which nature accomplishes a cure. The first thing observed when an animal receives a wound is the blood escaping, and a part of it coagulating, so as to form a crust over the wounded part, which, if the injured surface be not extensive, will be sufficient to protect the sore from external influence, and allow the formation of a healthy skin underneath. Should the injury be more severe, pus is thrown out, which speedily becomes dry, and forms a scab, commencing at the edges, and gradually extending to the centre. This scab falls off spontaneously when skin is formed underneath, but if it be removed before this takes place, fresh matter is thrown out, and the whole process is again to be gone through, and thus so much time is lost. In attempting to imitate the natural process, an application must be used which will form an incrustation resembling in its effects the natural scab, and the dressings must be removed as seldom as possible. It appears that only a superficial ulcer scabs readily; "for if it be deep, the quantity of matter is too great to be speedily evaporated into a crust." In these cases the natural process may be assisted by the addition of some harmless substance, which will thicken the discharge, and form an incrustation. In this way even a superficial ulcer may be more speedily healed.

Mr Spender finds that "an ointment containing a very large quantity of prepared chalk forms the best artificial crust. The earthy matter must be in a much greater proportion than enters into any ointment in the pharmacopœia, consisting of about three pounds of chalk to two pounds of lard. Even four pounds of chalk will be taken up by two pounds of lard; and if about three ounces of olive oil be added, the ointment will not be too stiff, but will easily admit of being spread on the linen. The best method of preparing this application is not by rubbing the chalk down with the lard; but, having previously reduced the chalk to a very fine powder, heat the lard to a tolerable temperature, and whilst it continues hot, gradually add the levigated chalk in the same vessel in which the lard was warmed. By this means it forms more of a solution than a mere addition, and the two ingredients thus become more intimately blended together. This should be stirred till it is nearly cold, and then placed by for use." The ointment prepared in this manner is preferable to that prepared in any other way, as the mass is more homogeneous.

Mr Spender conceives that the employment of this ointment is attended with the following advantages. 1*st*, It is extremely mild and harmless in its nature, and rarely produces pain. 2*d*, The lard employed being merely sufficient to hold the chalk in suspension, as soon as it is melted and absorbed, the earthy matter is disengaged, and combines with the discharge. The fluid from many ulcers is very acrid, inflaming and excoriating the skin in the neighbourhood, and perhaps perpetuating the disease. The chalk deprives the secretion of its irritating properties, and converts it into a comparatively harmless compound. 3*d*, From this compound and other portions of the chalk, an incrustation forms first on the surrounding skin, and then on the margins and face of the ulcer. If the discharge is great, none may be deposited for the first two or three dressings. Mr Spender conceives this to be its great excellence, that by its forming slowly an incrustation, it resembles the concretion of the natural scab. He tried for some time sprinkling the sore with powdered chalk, and plastering it over with a watery solution of it, but found that the chalk coating formed too rapidly, and produced hard earthy uneven knobs, which acted as extraneous substances. The chalk ointment is not liable to this objection, as the earthy matter is deposited slowly and uniformly, and, besides, does not confine discharge, as the purulent secretion, when large, washes it away. *4th*, The dressings do not require to be frequently removed, and the surface of the ulcer is thus less exposed to disturbance. Mr Spender justly reprobates the custom of frequently changing the dressings, washing and sponging the sore, which frustrates or retards the efforts of nature. The quantity of the discharge may demand the removal of the dressings, but this is sufficient without washing or pouring hot water over the surface of the ulcer.

Thus the chalk fulfils two of the conditions necessary to imitate the natural process, by forming an artificial scab, and allowing the dressings to remain undisturbed for a longer period than other applications do. It is unnecessary to add, that the chalk ointment is applicable to any sore or denuded surface which we are anxious to heal rapidly. Mr Spender has found it very serviceable in burns and scalds, and when a blister has been applied to a young child, and the surface is not disposed to heal. But the instances in which the chalk ointment thus acts beneficially when applied by itself, are those in which the sore is uncomplicated with any peculiar condition of the parts. When, however, the veins are varicose, or adventitious deposits exists, or the tunics of the skin are altered in texture, or any specific poison produces its influence on the part, all these conditions must be taken into consideration, and a healthy action must be induced. This is to be accomplished by approximating the diseased structures to their natural form and function.

The circumstances which retard or oppose the healing of an ulcer are, 1*st*, varicose veins; 2*d*, adventitious deposits; 3*d*, the form of the ulcer; and 4*th*, the existence of constitutional disturbance or debility. The remedy for all these local obstacles is well adjusted compression applied powerfully to the limb, which acts both on the local character of the sore, and the general condition of the leg. It flattens and brings together the edges, and reduces the area of the ulcer;—it supports the distended and weakened veins, and assists the absorption of the solid or fluid matter deposited. The manner in which this is brought about is fully and satisfactorily explained in the present treatise, to which, as our limits do not permit us to dwell longer on this point, we beg to refer such of our readers as are anxious for more particular information.

Mr Spender thus furnishes the results of his application of the foregoing principles to practice.

> "I have generally found that the combined application of the two general principles thus briefly explained has fully succeeded in practice. The object which has always been kept in view is to unite them both in such a manner that the veins and other structures may be supported underneath, whilst the ulcer is properly protected above. When this is done, many ulcers, which at the first impression appear to be very unhealthy, and would seem to demand some local remedy to cleanse and correct them, put on a more favourable aspect as fast as the pressure restores a more natural action in the parts below. Being satisfied that it is the diseased condition of the veins and other structures whenever it exists, that exerts the chief influence on the character of the sore, and accounts for its obstinacy, primary attention is directed to this condition, and an improvement in the structures is soon followed by a corresponding improvement in the appearance of the ulcer. When this conversion, from an unhealthy to a healthy state has taken place in the sore, the chalk ointment forms a protecting crust to shield its face, and a firm cicatrix is soon produced underneath its covering. Even, therefore, when an ulcer is very ill conditioned at first, I do not begin by applying poultices to draw it, or stimulants to correct, but simply cover it with the chalk dressing, tightly apply the bandage, and wait and see if its character do not quickly alter under the use of the pressure. When this most useful remedy has acted in the manner already described, the aspect of the sore is almost always changed; and its correction being chiefly accomplished from within, I do not commonly attempt in the beginning of the treatment to effect it from without. I have found from experience, that a little patience at the commencement is amply compensated for in the progress of the treatment. For, in almost every case, as soon as the compression alters the condition of the subjacent structures, the character of the superficial ulcer improves, and heals much more readily under the chalky crust, than by the use of external stimulants and correctives. The propriety of this method of proceeding I find more and more confirmed by every day's experience; and I now rarely, if ever, have recourse to any local or external corrective until I have given the tight pressure and mild application a fair and proper trial."—Pp. 86, 87.

In applying these principles, however, to practice, some exceptions will be met with, and some modifications be rendered necessary, which Mr Spender notices at considerable length in his third chapter.

Before discussing the application of the principles just laid down, to particular cases, the author notices two remedies which commonly form part of the treatment of ulcers of the leg,—poultices and rest, to both of which he brings forward some very valid objections. To the use of poultices he objects, because they weaken and dilate the parts on which they are applied, and thereby increases that condition of the limb on which the worst species of ulcer depends. Even in the few cases where the sore looks unhealthy, and requires to be corrected, it may be dispensed with, unless incomplete sloughing exists, because the improvement of the ulcer may be accomplished by other means, and without loss of time. It acts also prejudicially on the sore, by making the granulations soft, pale, and flabby, and by converting the margins into spongy insensible edges, with a sharp abrupt termination. It also absorbs the purulent matter which is preparatory to reparation, and thus, though another portion is speedily thrown out, so much time is lost, and each renewal of the poultice is a reparation of the evil.

To the observance of absolute rest several objections are made. If the obstacle to the cure of ulcers of the lower extremity was owing simply to the dependent position of the limb, the placing it in a horizontal position would be sufficient. This, however, is not the case; and, even supposing it were, it would be only one means of accomplishing our object, the assisting the circulation of the fluids. This end may be attained in a much greater degree by pressure. Rest will not reduce to any considerable degree a varicose or enlarged limb. Nothing will make the varices and deposits disappear except well adjusted powerful compression; and hence confinement is inferior, as a means of cure, to a tight bandage. Without a bandage exercise would do mischief; but with one properly applied, several inconveniences are avoided, and many advantages secured. Confinement of any sort, in general, is prejudicial to the general health, which exercises considerable influence over the local disease, while exercise, if safe, must improve both. Add to this, that patients, being peremptorily told that rest alone can cure them, and being unable, from their circumstances and occupations, to take it, go on for years with a painful and disgusting sore, which impairs their health and deprives them of all comfort. Mr Spender believes, that not only is it unnecessary to confine patients during the treatment of ulcers uncombined with active inflammation, but that the cure, accomplished during exercise, is attended with this advantage, that a relapse is not so apt to follow. When the leg is quiet, a small degree of energy is sufficient to heal the sore; but the newly formed parts are not endowed with sufficient energy and strength to resist the effects of exercise, and are consequently soon destroyed. To cure a sore, however, when the leg exercises its usual movements, requires such a degree of power in the restorative process as is capable of sustaining the vitality of the new structures. Mr Spender goes a step farther than this. Not only does he assert that an ulcer may be cured notwithstanding the limb is moved, but he believes the cure to be "hastened by allowing it to follow its ordinary uses, provided it be properly supported by the assistance of a tight bandage." Exercise he conceives to act beneficially in two ways, as a stimulus to the action of the parts producing healthy and energetic granulations in a shorter period, and as a check on their growth, thereby indirectly increasing their strength. These theoretical views are borne out by the author's experience. He has entirely renounced the use of rest as a remedy, except where active inflammation exists in the limb. Exercise, combined with bandaging, always forms part of the cure; and the result is, that he finds by experience that patients recover as fast in walking about as they do by being confined, besides being much less liable to a recurrence of the disease. Having thus disposed of the routine practice which consists in poultices and rest, Mr Spender proceeds to give his views of the treatment necessary in particular cases. Into this detail, though highly interesting, our limits do not permit us to follow him, and we must be content with noticing only the outlines.

Mr Spender inculcates the necessity of a careful examination of the vessels, integuments, and ulcer, and minute inquiry into the history of the case. If there be inflammation, it must be subdued; but no time is to be lost in improving the appearance of the ulcer, as compression properly applied never fails to accomplish this. The surface and sides of the sore to some distance beyond its edges are to be covered with the chalk ointment, spread about the thickness of a wafer on thin linen, and a simple bandage of flannel or calico is to be firmly and equally applied. All compresses, plates of lead, and the like, are worse than useless, as they act as obstacles to the circulation in the inferior parts of the limb.

Mr Spender gives minute and judicious directions for the application of the bandage. He prefers in most cases one of flannel, because it possesses the properties of being more yielding and elastic, and answers consequently better where the greatest degree of pressure is not required. The breadth of the bandage ought to be one inch and a-half for children, an inch and three quarters for women, and two inches for men, when it is made of calico, but a little broader when made of flannel. The length is from four to eight yards, according to the patient, and recommends that it should be divided, in order that it may be more tightly rolled, and more easily applied.

In stating that he has applied tight bandages to hundreds of sore legs of all descriptions, and that he scarcely recollects an instance in which the remedy could not be borne, and where the pain was not lessened, the author examines the opinions of Sir E. Home and Mr B. Bell on this subject, and shows that their views were warped by their peculiar theories and preconceived notions.

The length of time that must elapse before the bandage and dressings are to be removed will depend upon the size of the ulcer, and the quantity of matter discharged. They are, however, to be allowed to remain on as long as no uneasiness is present, which is a better mode of regulating the time than by the measurement of hours and days. The bandage is to be rolled up as it is taken off, and the thin linen dressing gently raised. If any film is observed, or any incrustation on the surface or edges, it must by no means be removed, for, by officious meddling, the work of twenty-four hours may be destroyed in one minute. If, however, the ulcer is very extensive, and successive deposits on the skin surrounding it form so thick a crust as to prevent the sore itself from receiving the benefit of the pressure, it may then be carefully removed, as it has already accomplished its chief service, by rendering the skin firm and substantial.

The exceptions to the treatment above described, are, 1*st*, extremely deep and callous ulcers; and, 2*d*, highly irritable and specific ones, both of which are improved and assisted by the use of stimulating applications, for the purpose of exciting a healthy action in the former, and altering a morbid one in the latter. The red precipitate, or citrine ointment, he considers the best local application as a stimulus, always combined, however, with pressure. These ointments do not admit of mixture with chalk, as some decomposition might take place, but, by a little management, they produce a coating on the surrounding parts and edges of the sore. The deposits or coagula are never disturbed, the matter only being wiped from the surrounding integuments. Thus the main principle is never lost sight of, and thus an incrustation is formed at the same time that a proper stimulus is applied to the sore. It is always advisable to watch the gums, as the mercury is apt to be absorbed, and affect the system.

Highly irritable and sensitive sores are frequently more quickly improved by the use of some stimulating application than by poultices. This is on the principle of destroying the morbid condition of the parts by setting up a more acute action, which lasts for a shorter period. All the remarks on the indolent ulcer are applicable to this species. The two kinds of cases, when the ulcer is very indolent, and when it is very irritable, are to be considered merely as exceptions to the general rule, and by no means form the basis of treatment. As soon, therefore, as the indolent ulcer is roused to action, and that of the irritable corrected, the remedies recommended above are to be laid aside, and the usual treatment adopted.

With the concluding chapter, on the propriety of healing ulcerous affections of the leg, we do not deem it necessary to take up the reader's time. For the heating of ulcers, Mr Spender strenuously contends, and shows that, wherever they act as a drain to carry off the excess of blood, it is much better to prevent its formation, or divert it to some other outlet by low diet, purgatives, or a combination of both.

We now conclude our notice of Mr Spender's work. Its principal fault is diffuseness, and an excess of sensitiveness, which urges him to meet every possible objection to his views, and to defend himself from every attack which he conceives it possible to make on his motives, his reasonings, his doctrines, and especially his originality, of which he is particularly jealous. This we do not think was at all called for. One author may have advanced one part of the system, and another another; but Mr Spender has undoubtedly the merit of grouping them all in such a manner as to draw from them a new, consistent, and rational mode of treating an obstinate and frequently loathsome disease. We need hardly say that we heartily recommend the work to the perusal of our readers.

ART. VI.—*Ueber das Gehirn, das Rückenmark und die Nerven, u. s. w. On the Brain, Spinal Chord, and Nerves, an Anatomico-Pathological Inquiry.* By Professor MAYER of Bonn. (From the Acta Academiæ Caes. Leopold Carol. Nat. Cur. Vol. vi. P. ii. Communicated on the 26th January 1833.)

THE contents of this essay deserve to be known to the English reader, since they consist of some curious experiments and observations made on the brain, and especially through its blood-vessels.

Professor Mayer informs us that he has performed a considerable number of experiments on the brain and its parts, by transfixing it with a steel bodkin; and the results of which he may afterwards publish. In the present paper, he confines himself to the narrative of several experiments which he had undertaken with the same object, viz. to throw some light upon the influence of the brain over the organization of the whole body, and in which he adopted a method of experiment which he regards as very simple.

The question which he was desirous to determine was, in what manner the energy of the brain, and the influence which it exercises over the general organism, is maintained, when the integrity of the organ is destroyed, not by wounds and injuries, but when the current of blood, which has been generally regarded as the chief source of its life and energy, is suddenly, partially, or entirely interrupted. To carry into effect the means of deciding this point, he thought of two methods of inquiry; the first, the operation of inclosing in a ligature the arterial vessels which convey blood to the brain; and the second, the injection of foreign fluids into the arteries of the brain.

To determine the effects of the ligature of the arterial trunks proceeding to the brain, Professor Mayer applied a ligature to one or both carotid arteries in eighteen different cases in rabbits, dogs, pigeons, in a horse, in a goat, and in a marmot, and with various effects, according as the circulation of one or both vessels was interrupted. Though, in the first case, there appears slight insensibility, and even loss of power, these symptoms are temporary, and after two or three hours the animal presents no remarkable change. It is different, however, with the ligature of both carotids. Most of the animals so treated died. Great feebleness and slowness of the motions of respiration and pulsation of the heart, with more or less loss of temperature and voluntary motion followed. One animal ran off, and the result was not known.

It would be rather tedious, and perhaps not very profitable to our readers, were we to follow the learned Professor through the long catalogue of not very gentle experiments which he has here detailed; and we believe that we shall communicate a view not less just and quite as instructive, if we give a short statement of the general results of these trials, very nearly in the terms in which the author has deduced his conclusions.

In the first experiment, the application of a ligature to one carotid caused in a rabbit no remarkable accident. In the second experiment, however, the application of a ligature to both carotids in a dog was succeeded by the following consequences. The beats of the heart diminished somewhat in frequency; the respirations fell from 42 in the minute to 24; then came feebleness of the eyes, lethargy, shaking, and turning of the body to one side. On the sixth day after, the animal was well. In the third experiment, ligature of both carotids in a rabbit was followed by no remarkable effect. In the fourth experiment, the ligature of both carotids in a dog was succeeded by lethargy, feebleness of vision, and diminution of the number of the respirations. On the fourth day, however, the animal was again well.

In the fifth experiment, the ligature of both carotid arteries in a pigeon was followed by decided consequences; for instance, considerable weakness of the eyes, giddiness, shaking of the head, inability to maintain the erect posture, diminution of the respiration from 105 to 22 in the minute, sinking of the temperature to 37° Fahrenheit, yet with little change in the action of the heart. On the fourth day death ensued amidst convulsions.

In the sixth experiment, ligature of both carotids in a rabbit gave rise to very serious effects; viz. wavering of the head, stercoraceous vomiting, convulsions, and death after fourteen hours. Upon dissection, the brain was void of blood; the lens of the right eye presented an opaque capsule. The lungs contained much ecchymosed blood. The right sinus of the heart was occupied by *coagula* partly white; the left sinus filled with dark clots. The stomach was much contracted; in two parts dissolved; and it contained chyme, similar to the excrement in the colon, some not very acid gastric fluid, and albuminous mucus. The *ileum* contained mucus and thick excrement. The bladder was filled with clear urine. Some serum was found in the peritoneal cavity, and a good deal in the *pericardium*. The carotid arteries were fairly tied on both sides; and the *nervus vagus* and sympathetic were quite untouched. The wound presented no inflammation, nor any exudation of lymph upon the nerves.

In the seventh experiment, the ligature, first of the right carotid artery, and two minutes after of the left, in a horse, gave rise to very formidable consequences; for instance, feebleness of the eyes, vertigo, feebleness of the muscles, then universal palsy, as if struck by lightning, inability to swallow, complete madness, convulsions, and death after fifty-eight minutes. Upon dissection, the carotid artery, opened above the ligature, discharged blood of a dark brown black colour, in a forked stream of one inch. Below the ligature, it bled also, but in a more forcible stream, and the blood was redder and purer.

In the eighth experiment, the ligature of both carotids in a rabbit was succeeded by the following phenomena. Insensibility in the decussating direction, viz. of the right ear and left eye; panic terror, and lolling of the head to one side; and diminution of the number of cardiac contractions, with languor of the respiration. On the third day recovery was visible.

In the ninth experiment, in which both carotids were tied successively in a rabbit, and the left pneumogastric nerve was included in the ligature, the following symptoms ensued. The head was lifeless, especially on the left side; the left eye insensible; the animal fell to the left side with convulsions and tetanic motions, especially *trismus*; the respiration became slow and rattling; the action of the heart feeble; and the temperature fell to 48° Fahrenheit. At the sixth hour after the operation, complete palsy and death ensued. On dissection, blood was found extravasated in the lungs, and in the stomach, as in the *melæna* or *morbus niger* of Hippocrates, connected with erosion of the villous membrane.

In the tenth experiment, ligature of both carotids in a rabbit produced a train of important consequences. There was evident decussating palsy and insensibility of the eye and ear. (The left eye was almost at first insensible, and at the same time the right ear; while the right eye and the left ear remained longer sensible.) *Tetanus* with *trismus* ensued; indifference to food, with inability to swallow, and regurgitation of food from the *æsophagus*. The cardiac contractions diminished in number; the frequency of the respiration fell to 16; and the temperature to 59° Fahrenheit. Complete coldness of the animal, and death, with rigidity and loss of irritability, took place on the fifth day. After death an unusual quantity of pure gastric juice was found in the stomach. In both eyes there had been formed on the anterior surface of the *iris* an inflammatory membrane, closing the pupillary aperture.

In the eleventh experiment, in which both carotids were tied in a rabbit, the effects were the following. Evident decussation of the affection of the eye and ear; afterwards death and insensibility of both eyes; *trismus* of the lower jaw, distortion of the head, and *chorea*; the cardiac contractions diminished to 90, the respiratory motions to 20 in the minute, and the temperature to 55° Fahrenheit. Death ensued in the course of nine hours and a-half after the operation, amidst symptoms of universal palsy.

Upon dissection, the stomach was found to be eroded, and containing points of extravasated blood. The windpipe was filled with froth and inflamed, and the lungs extremely loaded with blood. The brain, especially the right hemisphere, was moderately empty of blood. The carotids, which were situate beside the *infundibulum*, contained little blood; and the greatest quantity of blood was found in the vessels of the *Medulla oblongata*. The carotid artery contained some blood above the ligature both on the right and the left side.

In the twelfth experiment the right subclavian and carotid arteries were tied in a goat, and an hour after the left carotid was tied. The results were, diminution of the frequency of the respiration and cardiac beats, affection of the eyes, giddiness, wavering motions of the head, inability to maintain the body on the legs, convulsions, *tetanus*, and death in the course of four days.

On dissection, it was found that both carotids had been tied, with the pneumogastric nerve on the left side, and the subclavian beyond the origin of the vertebral artery, which, therefore, remained pervious. The carotid contained above the ligature some fluid and coagulated blood; below it was filled with clots. The right subclavian artery, and also the jugular vein, were filled with clots. The right and left side of the heart contained venous blood. A part of the lung had undergone suppuration. The brain was full of blood. The wound was quite dry.

In the thirteenth experiment, an iron bodkin was introduced into the brain of a full-grown female rabbit, and carried straight into the *cerebellum*, as was afterwards ascertained by dissection. Yet neither immediately after the operation, nor on the following days, was any change in the breathing, the action of the heart, the motions, or the vivacity of the animal, evinced. Five days after this gentle and inert experiment, both carotid arteries were inclosed in a ligature, and the usual train of symptoms ensued; viz. feeble and tardy respiration, diminished frequency of the heart's action, insensibility and turbidity of the globe of the left eye, *strabismus*, and death on the eighth day.

Dissection showed nebulosity and ulceration of the left *cornea*, an inflammatory membrane on the *iris*, covering its anterior surface and closing the pupil, a carbuncular pustule in the mouth, the right sinus of the heart containing much, the left sinus little blood, the lungs natural, the spleen bloodless and moderately contracted, the stomach containing much recent food, the *ileum* collapsed yet not empty, the colon moderately filled, and the *uterus* reddened.

In the fourteenth experiment, an iron bodkin was introduced from the right to the left side of the head of a full-grown black rabbit, into the ante-auricular region; and it was found on dissection that the bodkin had passed by the upper surface of the *cerebellum*, between it and the posterior lobes of the brain, and injuring only the latter somewhat. Neither immediately after the introduction of the instrument nor the following day was any change observed.

On the seventh day thereafter, both carotids were inclosed in a ligature, with the effect of inducing slowness and feebleness of respiration, and action of the heart, palsy of the right eye, ulceration of the *cornea*, turbidity of the aqueous humour, inflammation of the *iris*, with the production of a false membrane, gradually increasing weakness and feebleness of respiration and the heart's action, and death on the twenty-first day after the introduction of the bodkin, and the fourteenth after ligature of the vessels.

Dissection showed that, in this instance, the pneumogastric and sympathetic nerves had been included in the ligature on the right side, but not on the left. The part to which the ligature was applied was yellow and not inflamed. The right sinus of the heart was full of blackish blood; the left of reddish. The lungs were of a tile-red colour, particularly the left.

In the fifteenth experiment, in which both carotids were tied in a full-grown gray-coloured rabbit, the phenomena already enumerated ensued, and among these, very intense *ileus* was developed, and convulsions of the hind legs. On the 6th day after the application of the ligature, an iron bodkin was run into the brain; and on the second day after, the animal appeared to be blind, run against every thing, and died between the evening of the 8th, and morning of the 9th day.

Upon dissection, the brain and *cerebellum* were found natural, unless in the parts through which the bodkin had passed, namely, through the lateral ventricles, and in which the white cerebral matter was of a dark-brown colour; but elsewhere, this part of the brain was white. The *œsophagus* was somewhat reddened; the stomach, though moderately filled with digested food, showed no trace of inflammation; but the intestinal canal was loaded with blood, and showed throughout traces of inflammation. The lungs were reddened in asteroid spots; the heart was intensely reddened, and the sinus was empty. The ligature of the carotid was found to be adherent.

In the sixteenth experiment, Professor Mayer had applied a ligature to the right carotid of a strong black rabbit, without giving rise to any remarkable effects. He then applied a ligature to the left carotid; five minutes after he tied the right *subclavian*, and seven minutes after the trunk of the *innominata*. Immediately ensued complete palsy of the head and fore-legs, then violent tetanic jerks of the trunk, dilatation of the pupils, with extinction of their brilliancy, and after the lapse of a minute from the application of the last ligature, death. It was remarkable that, six minutes after death, the heart still beat energetically; nay, forty minutes after, when the animal had been already ten minutes stiff dead, the heart continued to beat eleven times in the minute.

In the seventeenth experiment, ligature of the two carotids and vertebral arteries in a pigeon produced immediate death, with convulsions and tetanic spasms.

In the eighteenth experiment, the Professor seized an unfortunate marmot, completely involved in his winter sleep, at 32° Fahrenheit; and tied both carotids so rapidly and gently, that the animal did not once awake during the operation. Thirty minutes after, the temperature rose in the mouth to 53° Fahrenheit, and in the *anus* to 49° Fahrenheit. The next day the marmot was found still sleeping, and the temperature in the *anus* was 71° Fahrenheit. His sleep continued to be more profound, and he continued to be more rigid and more intensely drawn together; and on the third day the marmot was found lifeless.

In this case the experiment produced great tetanic rigidity.

We now come to the second order of experiments, those, namely, in which Professor Mayer injected foreign fluids into the arteries distributed to the brain. Of these there are six; the animals employed were, four rabbits, a ram, and a goat; and the fluids injected were quicksilver, and common wax injection.

In the first experiment, the injection of some quicksilver into the carotid artery of a rabbit produced indications of intense suffering. Then came giddiness, rolling of the head, insensibility of the eyes, at first on one side, then on both, *tetanus*, failure of the action of the heart and respiration, and death in twenty-two minutes.

Upon dissection, the temperature in the abdomen being still 104° Fahrenheit, muscular irritation and the action of the heart were no longer cognizable; but the peristaltic motion was active. The pulmonary veins were red; the right *sinus* of the heart contained a moderate quantity of black blood; the left *sinus* some red blood. The lungs were natural; the stomach was full of food; the gall-bladder empty.

The arteries of the eye contained no quicksilver; but a cervical muscle on the right side presented some. This metal was found also in the arteries on the surface of the right and left hemispheres of the brain, and the surface of the *cerebellum*. When the brain was removed, it was observed that the quicksilver was in both carotids at the base of the brain. The arteries of both lateral chambers, and those of the *corpora quadrigemina* were full of it. But in the substance of the brain was none.

In the second experiment, some quicksilver was injected into the left carotid artery of a strong full-grown rabbit. In three minutes the animal became convulsed, and screamed, and the head was thrown backwards; respiration and the action of the heart ceased; the eyes, nose, and ears, were insensible, while the trunk, the hind legs, and the tail, continued still sensible. At the fourth minute, the animal was lifeless.

Upon dissection the basilar and carotid arteries were found full of quicksilver, globules of the metal were seen in the ciliary artery of the right eye, and two globules in the anterior spinal artery of the spinal chord.

The right and left sinuses of the heart was full of dark-red blood. The lungs were natural.

In the third experiment of this kind, quicksilver was injected by a small tube into the left carotid artery of a gray rabbit; while about half an ounce of blood escaped. The consequences were the following. Motion to the right in a circle; failure of the action of the heart, respiration, and the production of animal heat; palsy of the head, and the eyes, and the ears, first on one side, then decussating; *trismus;* indifference to food; inability to swallow, and *ileus*; spasmodic rigidity, and death on the fourth day.

Dissection disclosed the following phenomena. The temperature in the pectoral cavity was 77. Several arterial branches, particularly three or four on the surface of the left hemisphere, and also the ophthalmic artery, were filled with quicksilver. The hemisphere itself presented several chalk-white spots. In the left ventricle, the *corpus striatum* was completely destroyed, and the greater part was absorbed; and in the destroyed mass was observed a vessel filled with quicksilver. The other parts of the brain and the *plexus choroides* were natural.

In the optic nerve, at the entrance of the *retina*, were several quicksilver globules. The cornea was reddish, the aqueous humour turbid, and a delicate albuminous film shut the aperture of the pupil.

The lungs were deep red. The right and left sinus of the heart were filled with dark slightly coagulated blood.

Some alkaline serum, which gave a white colour to blue litmus paper, was found in the abdominal cavity. The liver was brown; the bile deep-coloured; the spleen reddish-brown. The stomach was full of green food; and its villous membrane came away like a white pulp. Beneath this, and in the muscular coat, were innumerable bloody exudations, from the size of a pin-head to that of a lentil, resembling mushrooms. About an ounce of gastric fluid, which reddened litmus paper, was found.

In the fourth experiment, some quicksilver was allowed to run into the left carotid artery of a rabbit, after which the artery was tied. The results were, palsy of the head and eye; loathing of food; *ileus*, with stercoraceous vomiting; ulceration of the *cornea* of the left eye; progressive emaciation to the 18th day, when strength was exhausted; the temperature was very low; the body was rigid; and death ensued.

On dissection, no quicksilver globules were found in the vessels of the brain. In the throat was an abscess. The organs of the chest and belly appeared to be wasted and shrunk. Excepting the ulcer of the *cornea*, the left eye was not morbid.

In the fifth experiment, Professor Mayer injected into the left carotid of a strong ram, by means of a common anatomical syringe, a small quantity of common injection, rendered fluid by means of heat. After one or two minutes, the head and throat were insensible and altogether paralytic. The head fell over on the shoulder, and the eye was insensible and dead. Respiration was immediately at the first suddenly and entirely stopped; but, on the contrary, the heart beat very quickly and strongly about 200 times in the minute. At the third minute, the fore-legs, and, immediately after, the hind-legs, were paralytic; the animal fell on the belly to the ground, unable to support himself; while slight convulsions in the fore-legs and hind-legs, and then in the tail, ensued; and sensibility was extinct in the fore-legs, and lingered still in a slight degree in the hind-legs and tail, but quickly ceased there also. The action of the heart soon became slower and feeble, till at the twelfth minute it stopped entirely, and death was complete.

Dissection showed that the injected mass had filled from the left carotid artery the whole circle of Willis, to the basilar artery. A small portion was found in the descending aorta, probably impelled from the right internal carotid. But there was none in the heart.

In the sixth and last of these experiments, a small quantity of the same injection was impelled into the left carotid artery of a goat, after the right had been secured by ligature to prevent the refluence of the injection. The same phenomena as in the last experiment ensued. A minute after injection, the head was void of sensation and motion; and this insensibility and palsy were at once propagated to the tail. The respiration suddenly stopped and never returned; though at the sixth minute a short gasp took place. At the tenth minute death was complete.

Dissection showed that the injected matter had penetrated from the left carotid artery to the cerebral vessels, as far as the basilar artery, and had thence displaced the blood, without, however, having moved it farther into the ramifications of the circle of Willis. In the external carotid also was found a small portion of injected matter mixed with blood; and in the right carotid also was a small portion. But no trace of it was observed either in the chambers of the heart, or in the arch of the aorta, or in its descending portion.

From the phenomena exhibited by the experiments now detailed, Professor Mayer deduces a series of physiological conclusions regarding the influence of the brain on life and its actions. Though these conclusions are perhaps rendered less palpable by the adoption of the thoughts and phraseology peculiar to the German schools than they might have been, we shall study to exhibit them in as accurate and intelligible a shape as is practicable.

Professor Mayer distinguishes, like most physiologists of the present day, all the phenomena and actions exhibited by animal bodies into two orders;—first those proper to animals, and second, those common to animals and plants. The former he distinguishes, like all his countrymen, by the denomination of phenomena of the *Animal Vital Sphere;* the latter by that of phenomena of the *Vegetative Vital Sphere;* and the hypothetical or assumed source of all these actions is a principle to which the Teutonic physiologists, from Blumenbach to the present author, have all applied the denomination of Vital Force, (Lebenskraft).

The first general conclusion which Professor Mayer deduces from his experiments is the following. When the *encephalon*, understanding by this term the brain, *cerebellum* and *medulla oblongata*, has the supply of its conservative principle,—the blood, interrupted or cut off by ligature of its nutrient vessels, or by filling them with a foreign substance, the following phenomena ensue—first in the sphere of animal life, impaired consciousness, *vertigo*, diminished sensitive energy, indicated in the decussating direction, insensibility, palsy, extinction of irritability, and death;—and, secondly, in the sphere of vegetative, organic or automatic life, failure of the action of the heart and respiration, evident inability to swallow, with inverted peristaltic motion, falling of the animal temperature, spasmodic closure of the mouth, *tetanus*, rigidity, and death.

He further deduces the following subordinate or secondary inferences; supported by suitable proofs.

1. The integrity of the energy of the *encephalon* is in adult mammiferous animals the necessary condition of life; or the *encephalon* is the peculiar and essential source of vital power, (*fons vis vitalis.*)

Though to this proposition it be objected, that not unfrequently abortions of the lower animals and of the human race without brain and even without spinal chord, come into the world alive, and often very strongly developed, yet this objection may be set aside by the following considerations.

a. First, the anatomical fact is not stated with perfect accuracy; since always, in place of the cerebral mass, probably in consequence of the morbid state of the carotid arteries, there is either a degenerated fungous body, or a medullary mass, partly dissolved in *serum*, which are sufficient to maintain the connection between the origins of the cerebral and spinal nerves as a whole.

b. That in these malformations there is none, or at least little, question of the presence of any form of animal life, in proportion to the yet remaining parts of the cerebral rudiments. Only the apparatus of irritability, viz. the muscular system, consists, according to rule, of a cellular mass.

c. That a pure vegetative form of life, as such malformations present, at least in the fœtus, may take place independently of the brain; since this is secured by the germinating or seminal force implanted in the animal *ovum*, which ought to develope for each organ its appropriate nerves, and to form the rest of the mass. Nerves, however, he remarks, are always observed in the smallest fragments of such malformed specimens of organization; and even other unusual specimens of spurious organization, as the production of teeth and hair in the ovaries, imply this nervous energy. This germinating force is the more energetic, the earlier the period of the animal embryo is, and it is greater at the commencement of the formation. It is progressively diminished, and becomes eventually subordinate to the influence of the *encephalon*.

d. Further, this vegetative life or this innate seminal energy has its limits, and scarcely continues beyond the period, during which the fœtus remains in the womb, since such malformations rarely survive beyond one day.

Although the inferior animals, for instance amphibious animals, continue to survive a long time after the destruction of the brain, this phenomenon is explained partly by the circumstance, that in these experiments the *medulla oblongata* remains still uninjured, partly by this circumstance, that in the inferior animals the spinal chord is larger in proportion to the brain; since the nervous mass progressively ascending in the scale of animals is more concentrated to the head, while in the animals still lower in the scale, for instance insects, mollusca, &c. the brain is arranged in individual ganglioform nerves along with the other organs.

2. The spinal chord is without the *encephalon* insufficient to the continuance of life; and the life of the spinal chord depends especially on the vital energy of the *encephalon*. This proposition follows especially from the 23d and 24th experiments, in which death suddenly ensued in the current of blood to the spinal chord being interrupted.

3. *Vertigo* and inability to maintain the erect position is also a consequence of the diminished energy of the brain. He conceives it to be impossible to ascribe this consequence solely to destruction of the energy of the *cerebellum;* because, in the experiments in which the carotid arteries were tied, the *cerebellum* still received nutritious blood by the vertebral arteries. The *encephalon* is the central organ of common sensation (*Coenaesthesis*) and by destruction of the life of the brain, common sensation is deranged.

This admission of common sensation in the life of the *encephalon*, Professor Mayer argues, communicates the conception of personal identity; and he accounts in this manner for certain changes in personal identity presented in the form of hallucinations, as when maniacs believe that they are made of glass, and hysterical females or magnetised persons imagine themselves under the influence of evil spirits.

4. The brain further appears, according to these experiments, to be the Regulator of the processes of vegetative life, *(rector vitæ vegetativæ.)* As the sensiferous power of the nerves of sense resides in the encephalon, which in this respect performs the part of the *sensorium commune*, so all generative energy of the nerves resides in the brain as the central organ of this generative organ.

Though the cause or principle of vegetative life, viz. of circulation, respiration, nutrition, animal heat, &c. does not reside in the brain; yet the impulse of the functions of vegetative life proceeds from the brain, and these functions cease when the energy of the brain is impaired.

The necessity, or the instinctive recollection of the necessity of the vegetative functions, according to Professor Mayer, is lost whenever the energy of the brain intermits. The animal suddenly ceases to breathe, or breathes in a slighter degree, always more slowly; he retains the food introduced into the mouth, forgets to swallow, and allows it to fall back; though the stomach acts, it is an antiperistaltic motion, which gives rise to *ileus*. Complete apathy takes place; and the animal dies, when the impaired cerebral energy, proceeding progressively, approaches at length to loss of temperature, starvation, rigidity, and feebleness. Professor Mayer thinks, that here an evident accordance between his experiments and those of Flourens may be traced.

He further thinks, that he here traces an accordance between the phenomena now specified, and those which are observed in the carotic or comatose stage of typhous fever. Persons labouring under typhous fever, he is of opinion, die from apathy to the actions of the vegetative life, in consequence of palsy of the brain, when they are not roused, and kept roused from their lethargy, by sinapisms and similar means. He reminds his readers also of the total absence of the stimulus of hunger, thirst, and even of respiration, in mental derangement,

The impulse and necessity of the functions of vegetative life have their seat in the brain.

For a fuller explanation and demonstration of this proposition, Professor Mayer refers to the Salzburg Medico-Chirurgical Gazette for 1815, Band. iii. S. 189; but he subjoins the following remarks. When the opposite experiment is performed, and the head with the brain is severed from the trunk, there are observed, in new-born animals, symptoms of instinctive necessity and impulse in the detached head. The head thus separated in new-born puppies, kittens, and other animals, sucks the finger introduced into the mouth for the space of from ten to fifteen minutes; it makes respiratory motions by opening the mouth,—a fact first observed by Le Gallois;—and the *glottis* is opened and shut alternately.

He also adds, that it is proved that the impulse, or instinctive feeling of hunger, thirst, breathing, although these sensations are distinctly manifested in other parts of the trunk, have their central impulse in the brain, or that the *encephalon*, as it is the *sensorium commune*, is also the centre of the instinctive desires,—the peculiar ὁϱμων of Hippocrates.

5. *Lastly*, That the circulation, the developement of animal heat, and, in short, nutrition and secretion, depend on the energy of the brain, and on the cessation of the life of the brain also cease; and that the impulse to the performance of these functions arises from the brain, Professor Mayer maintains, results incontestibly from the experiments above detailed. He does not deny that different causes of these functions exist in the body; but he maintains that the spring, to borrow the language of mechanics, which puts in motion all the wheels of the vegetative life, and without which they stand, is seated in the *encephalon*. He regards it as no objection to this view, that in acephalous fœtuses these functions proceed energetically, since to this the rudiment of a brain is amply sufficient; though it must be taken into account, that in such malformed productions the circulation is generally communicated by means of a healthy twin fœtus, the communication of heat on the part of the mother compensates for the developement of proper animal temperature, and, lastly, the nervous influence of the parent on the fœtus, though unknown in cause, is still incontestible in fact.

We have given the foregoing abstract of the experiments performed by Professor Mayer, and of the inferences deduced by him from them as to the influence of the brain on the whole system and its functions, without comment or remark, because it appears to us that on a subject so obscure and complicated as the functions of the brain, cranial and vertebral, and in which even at this moment several contradictory doctrines are taught by the most able physiologists,—it would be waste of time were we to occupy the attention of our readers with any critical remarks adequate to the importance and difficulty of the subject. We may observe, nevertheless, that, in the case of the injected fluids, we think the lesions by a great degree too violent and serious, to deduce from them any conclusions as to the effect of interrupting the access of the current of blood to the brain.

Upon the subject of the effects of the ligature of the cerebral vessels, we have to submit a few observations, to which we attach some importance. It is in these experiments a remarkable circumstance, that when the blood of one carotid artery was interrupted by ligature round the vessel, it appears to have caused only temporary uneasiness, and seems to have produced no serious or permanent detriment to the circulation of the brain or the functions ascribed to that organ; but that, on the contrary, when both carotids were tied, either simultaneously, or the one soon after the other, the most serious derangement in the functions of the brain ensues. Not only giddiness, loss of sensation and motion in various degrees and in different parts, and loss of consciousness, with indifference to the usual instinctive stimuli ensue; but the motions of respiration and the action of the heart become languid, feeble, and inert; and the animal dies apparently from the interruption of that influence upon the physiological agents of respiration and circulation, which has been generally attributed to the integrity and energy of the brain. It is remarkable, nevertheless, that these symptoms have by no means ensued in all cases in which both carotid arteries were tied; and in this respect the results obtained by Professor Mayer do not entirely accord with those obtained by other physiologists.

The great object in performing this experiment appears to have been chiefly to determine to what extent the statement of Galen is well founded, that the ligature of these arteries produces no *sopor*, or other conspicuous effect on the functions of the brain. Lamure found that, upon tying the carotid arteries of a strong dog, the animal showed no indication of *sopor*. Valsalva tied both carotids in dogs three times with variable results. In the first case, the animal betrayed marks of impaired vivacity and vigour; but possessed the full power of motion in all parts of the body. After swelling, however, of the lips, head, and anterior parts of the neck, with profuse discharge of fluid from the mouth, and great weakness of the whole body, he died on the sixth day. In the second case, the animal seemed spiritless, and refused food, and showed evident marks of muscular weakness during the first six days; but afterwards seemed to recover all his energies, and was killed on the twenty-second day after the operation. Fluid was found in the cavity of the spinal canal. In the third case, the animal was averse to food, seemed almost rabid, barked at every one, and died on the third day. Morgagni, to whom we are indebted for recording these experiments, takes care to add, that in neither of these cases was there sopor or loss of voice. But it is, nevertheless, pretty clear that the energy of the muscular motions was much impaired.

Baron Van Swieten, in like manner, tied both carotid arteries in a dog, and was unable to recognize any indication of inconvenience in the animal, which, he states, was vigorous and spirited after the lapse of eight days.

Bichat also informs us that he had performed this experiment without observing uniform results;—that the animal appears sometimes to be stupified, at other times to present no change in his faculties. " In general," he concludes, " the obliteration of the carotids is never suddenly fatal. Animals live without these vessels, at least for some time. I preserved in this state for several days dogs which were subsequently employed for other experiments. *Two, however, survived only six hours.*"* On what circumstances does this diversity of result depend?

The late Dr Kellie performed repeatedly this experiment; and he states, that, " though the animals were kept alive for several days afterwards, they appeared to suffer no inconvenience whatever."

We have seen, on the other hand, that, in the experiments of Professor Mayer, the ligature produced very great inconvenience, great failure of the voluntary power over the muscles, and great weakness of all the vital motions terminating in death. Is this lesion, granting its occurrence as a fact, of the nature of *syncope*, or of an apoplectic character? The usual mode in which interruption of the supply of blood to the brain indicates itself, would lead to the supposition, that it was rather of the nature of syncope, though evidently of a very peculiar kind. But, on the other hand, the operation of tying one carotid artery in the human body has in certain circumstances been followed by the occurrence of phenomena which would lead to the idea, that the partial or general interruption of the current of circulation to the brain does give rise to phenomena which are very closely allied to those of apoplexy, if, indeed, they be not the same. It is, indeed, a curious circumstance, that while in most of the instances in which one carotid artery has been tied in the human body, no unusual or unprosperous result has followed; in others, on the contrary, the operation has been immediately, or very soon, succeeded by some loss or derangement of motion, some affection of the mental faculties, indicated by loss of memory, or impaired judgment, loss of consciousnesss, and more or less indifference to the usual stimuli of the senses. As these cases are of no value singly, and can lead to general conclusions only when taken together, and in connection with the experiments already detailed, we submit a brief abstract of them.

1. The first is remarkable as being the first case in which the carotid artery was tied in the human body. A man had been gored in the neck by an ox, and the internal carotid on the left side had been so injured, that Mr Abernethy thought it indispensable to apply a ligature to the trunk of the common carotid. This vessel was accordingly tied between four and five of the afternoon of the day on which the accident happened; and the same evening between nine and ten, the state of the patient seem-

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* Recherches sur la Vie et la Mort, p. 160, II. Partie.

ed greatly improved. He had several times taken warm milk: some difficulty of deglutition, which had ensued on the accident, was abated; the pulse was moderately full and strong, and not very frequent; the patient appeared tranquil and rational; and though not allowed to speak, expressed himself satisfied in his situation.

The same night, however, he became unquiet, feverish and delirious, was several times affected with convulsions, which were more violent and evident on the left side, than on the right; he could scarcely swallow; was inattentive, though perhaps not insensible to external objects, with the pupils contracted, and the eyelids instinctively closed; with the pulse 130, hard, and the skin hot. Soon after the right side of the body was observed to be motionless, while the left side continued to be affected with convulsive tremors. The strength of the patient gradually declined; and after a severe convulsion fit, at ten P. M. of the second night, he died about thirty hours after the application of the ligature to the carotid artery.

The vessels of the *pia mater* were injected, and the membrane was blood-shot. Serous fluid was effused into the cellular tissue between the arachnoid tissue and *pia mater.* The brain presented marks of inflammation; and its vessels were full but not turgid. A considerable quantity of light brown serum was found in the ventricles.

Neither the trunk of the eighth pair, nor that of the great sympathetic, had suffered any injury. The superior laryngeal and the *descendens noni*, were the chief nerves injured by the accident.

The carotid artery was the only part included in the ligature,

The opinion given by Mr Abernethy on the cause of the symptoms in this case deserves particular attention. "Upon reflection, I can form no other opinion of the case than that which first struck me, which is, that though the stopping the supply of blood to the brain did *not* for several hours produce any apparant derangement in the functions of that organ, yet such a state was gradually occasioned by it, and which was attended, like the effects of concussion of the brain, with inflammation. It further appeared, that when the continued effects resulting from the derangement, and the inflammation were manifested together, the state of the patient much resembled that of a person who had suffered concussion."

Another observation by Mr Abernethy deserves attention, as a suitable introduction to the cases now to follow. After adverting to the fact, that the *right* side of the body in [illegible]
that is to say, the one opposite to that in which th [illegible]
blood through the carotid was interrupted, was [illegible]
proaching to palsy, while the left was [illegible]

forbear to speculate on this subject; the fact which I have mentioned deserves notice, and though it must stand alone, it may in future receive addition, and when thus supported, be applied to some useful purpose in physiology."*

It is remarkable that this fact was soon illustrated by another example.

2. On Friday the 1st November 1805, Sir Astley Cooper applied two ligatures to the trunk of the *right* carotid artery, for aneurism of that vessel, extending from the chin to the angle of the lower jaw, and which was attended with a sense of beating within the head, so violent, as to interrupt sleep. On the seventh day after, palsy of the *left* leg and arm, accompanied with great general irritability, ensued. The paralytic affection of the arm abated the following day, and on the 11th had disappeared so far, that on the 12th little difference between the powers of the two arms could be recognized. The state of the left leg is not mentioned. On the 17th, the patient presented symptoms of a high degree of constitutional irritation; the pulse was 96; she had much difficulty in swallowing; and she had frequent cough, with much distressing hooping. On the 19th, the pulse was very quick; on the 20th, it was 108, and small; and on the 21st death took place.

Permission to inspect the head was not granted.†

3. A man, named Joseph Verna, was admitted into the Hospital of Turin, with a large sarcomatous tumour situate behind the right angle of the jaw; and for checking the frequent hemorrhages from which, Professor Barovero proposed to apply a ligature to the trunk of the right carotid artery. This operation was accordingly performed on the 19th; and it was ascertained by dissection, that the pneumogastric nerve was untouched, and that the jugular vein was tied with the artery. On the third day after the operation, he had some fever, spectral delirium, and palsy of the *left* side of the mouth and the left hand; and fever in an abated form without delirium, and fits of giddiness continued to the tenth day;—after which he began slowly to recover strength.

On the sixtieth day after the operation, he presented symptoms of gastric fever, induced apparently by a slight excess in eating; but these symptoms, though moderated by purgatives and other remedies, speedily assumed the tertian form, and acquired a pernicious character in the course of a few days, with loss of sensation and *sopor*, which terminated in complete death on the sixty-ninth day after the operation.

Upon inspection, the brain and its vessels were found in a state similar to that of chronic inflammation; and the anterior part of the *right* lobe was covered by a fluid similar to a puriform exhalation.

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* Surgical Observations, by John Abernethy, F. R. S. London, 1804, p. 193–207.

† Medico-Chirurgical Transactions, Vol. i. p. 1. London, 1812.

4. M. Magendie applied, on the 4th March 1827, a ligature to the common carotid artery of the left side of a girl of 25 years, who was labouring under an enormous tumour in the site of the left maxillary sinus, with the view of modifying the circulation of the tumour, and diminishing the quantity of blood sent to it. The symptoms proceeded without any remarkable accident till the sixth day after the operation, when she was attacked with loss of consciousness for some time; inclination of the head to the left; separation of the eyelids of the right eye, yet contractile pupil; very slow pulse, with paleness, and respiration sometimes stertorous, sometimes easy, and every mark of approaching dissolution. During the unavailing employment of stimuli and counter-irritants, it was observed that the *right* arm was paralytic, and that, in the *right* leg, though not paralytic, the motions were deficient in energy and precision. Some difficulty of deglutition also, which was observed, was found to depend on palsy of the pharynx, and laryngeal voice was extinct, all her feelings being communicated by signs and motions of the lips.

A little more than two hours after, she was attacked with an epileptic paroxysm, in which the head was convulsively thrown back; both arms were forcibly contracted; frothy saliva issued from the mouth; the pupil was excessively dilated; and the pulse became very rapid. After this she recovered consciousness; and on the ninth and tenth days, deglutition became practicable. Some time after, the voice returned, and the right arm began to recover its motions. Three months, however, elapsed before the shoulder and arm could move very imperfectly.

The intelligence of the patient was enfeebled and much impaired. She seemed to be less conscious of her situation; and she was less apprehensive as to the future.

These cases evidently lead to the inference, that ligature of a single carotid artery may occasionally derange much the circulation of the cerebral vessels. The operation of tying the carotid has now been so frequently performed, not only for aneurism but for other disorders, without leaving any bad effects, that it is quite impossible to deduce a general conclusion as to its effects on the circulation of blood in these vessels. Thus, independent of the cases in which the vessel has been tied for the cure of aneurism, tumours, &c. we mentioned in the account of the fifth volume of the Calcutta Transactions, (Medical and Surgical Journal, Vol. xxxix. p. 205,) that Mr J. R. Preston, of the Honourable East India Company's Service, had applied, wit
out any unfavourable result, a ligature to the right common
rotid artery in a case of *hemiplegia* of the left side of
and in a case of epilepsy; and we find in the sixth

the same work, which has recently come to this country, that the same gentleman has since applied, first a ligature to the right common carotid, and then, about five weeks after, one to the left, in a case of *cephalaea* and partial palsy; and that he has performed the same twofold ligature at an interval of eleven weeks, in a case of epilepsy and *hemiplegia*,—yet without rendering the state of the patient worse in either. Nay, Mr Preston maintains, that, but for this operation of tying both carotids, his patients must either have been worse, or have probably been cut off by their respective diseases.*

Upon the whole, it must be admitted, that, notwithstanding the numerous experiments on the lower animals, and the trials made on the human subject, we are still left much in the dark as to the exact and uniform effects of interrupting the current of blood through the arteries proceeding to the brain.

With regard to the appearances of inflammation of the *iris* which took place in the experiments of Professor Mayer, it appears that this also is not quite without example. In a person in whom Professor Bünger of Marburg had applied a ligature to the carotid artery, the eye of the same side had been considerably injured. Professor Mayer infers that this is a change in the process of nutrition in the eye. It is so; but it must be observed, that the nutrition is impaired in consequence of previous inflammation, induced, so far as can be discovered, by the derangement of circulation. Has the state of the nerves distributed to the *iris* and *retina* any concern in the production of such effects?

The second, or anatomical part of this paper is devoted to some rectifications in the descriptions of the accessory nerve, the hypoglossal nerve, the pneumogastric and the glosso-pharyngeal nerve, the first cervical nerves,—all of which he maintains come from that part of the *medulla oblongata*, which constitutes the common point of union between the brain and *cerebellum* on the one hand, and the spinal chord on the other. As physiologists have distinguished the roots of the nervous trunks into anterior and posterior, or those ministering to motion and those ministering to sensation, he is led to inquire in what manner the nerves arising from this part of the nervous system are arranged in this point of view; and with what reference to this distinction into anterior and posterior roots of the human body and in that of animals. Of these nerves, therefore, he treats individually in the following manner.

1. Of the *nervus glosso-pharyngeus*, there is generally, and in his opinion without any exception, only one principal root found, which is justly regarded as a posterior root. It also enlarges

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* Transactions of the Medical and Physical Society of Calcutta, Vol. vi. p. 409.

without the cavity of the *cranium*, or, to speak more accurately, without the cavity of the *dura mater*, into the well known ganglion. In this nerve he has hitherto found nothing uncommon. But in the ox he observes two cords of this root, which are enlarged into two gray-coloured ganglions, still *within* the cavity of the *dura mater* of the *cranium*.

In birds the *nervus glosso-pharyngeus* is comparatively thicker and larger. He early found in the tongue of the papagay, always a fine *ramus lingualis* from the fifth pair.

The *nervus vagus* is, as the previous, composed of *one*, and that a posterior root.

He observes, however, that the portion of this nerve which comes from the lower part of the *medulla oblongata* or even from the spinal chord, remains undistinguished by anatomists. This posterior portion he names *ramus spinalis nervi vagi*. In man it is small, short, and rarely extends to the spinal chord. In the MAMMALIA again, especially in some genera, it is more strongly developed. This branch is delineated by the author in the second figure of his second engraving.

In the ox this spinal branch of the *nervus vagus* is very broad, and, projecting under the hypoglossal nerve, is composed of seven or eight separate fibres.

With the hypoglossal nerve it is very different in this respect. The three or four nervous chords which form its root, arise from the anterior layer of the *medulla oblongata*, between the *corpus olivare*, and the *corpus pyramidale*; and this root he therefore regards as an anterior one. No trace of any posterior root of this nerve has been hitherto recognized, either in man or any of the animals. But in several animals, such as the ox, the hog, some species of dogs, the sheep, and even occasionally in man, Professor Mayer succeeded in recognizing a small ganglion or ovoidal swelling, formed generally of two delicate nervous threads, arising from the posterior surface of the *medulla oblongata*; and in one instance in the human body, he found a small ganglion issuing from the spinal branch of the pneumogastric nerve, near the spot where this branch is united with the pneumogastric trunk, in the *fossa* of the *foramen lacerum*, and which then gave a fibre, which was connected with the anterior root of the hypoglossal nerve before its emergence from the *dura mater*.

Professor Mayer does not give any opinion on this connection of the *nervus hypoglossus* without the *cranium*, with the *nervus glosso-pharyngeus*, or with the pneumogastric nerves; and he leaves it to be explained by further observations, particularly in comparative anatomy. "It is in all circumstances remarkable," he adds, "that the hypoglossal nerve shows as it were, if I may so express myself, the necessity of deriving a posterior root from the spinal chord."

Professor Mayer thinks it probable that the accessory nerve may in like manner have an anterior or motiferous, and a posterior or sensiferous root,—chiefly through the medium of the cervical nerves;—but, as this is a mere conjecture, we think it unnecessary to take more notice of it. It is proper to remark, however, that while some recent observations show the connection of the accessory nerve with the posterior roots of the three superior cervical nerves, *without* the formation of a ganglion, the author gives an example in his first and second plates of this connection *with* the formation of ganglions. In the second figure of plate second, he represents a ganglion proceeding from the posterior root of the second, and another ganglion from the posterior root of the third cervical nerves, and both connected by means of delicate fibres to the accessory nerve.

Professor Mayer then considers the question, whether it is practicable or consistent with anatomical facts, to trace this double character in nerves throughout the whole system, and especially in the phrenic, on the one hand, and the sympathetic nerve on the other? This we cannot make intelligible without reference to the figures. But we may state that the general result is, that the phrenic nerve and the sympathetic nerve preserve the double character of the anterior and posterior roots, issuing from the fibres of the spinal chord.

In connection with this subject, he inquires into the grounds for the doctrine of decussation or crossing, in the spinal chord or *medulla oblongata.*

He observes, in the first place, that he found in a slight degree in man, and in a very well marked form in brutes, particularly striking in the horse, a sort of intercrossing or decussation of the cardiac nerves, of which the left went to the right ventricle and pulmonary artery, while the right was distributed to the left ventricle and the *aorta.*

He also found, with regard to the trunk of the pneumogastric nerves, and their distribution to the *œsophagus* and *cardia,* a similar decussation or intercrossing, which is very evident in the calf.

On the other hand, he observes, that the intercrossing or decussation of nervous fibres in the central region of the nervous system, viz. the brain and spinal chord, is manifest and definite in one spot, viz. the origin of the pyramids. This he always found in the human body; and to be entirely awanting in some MAMMALIA, and present in others. In several instances of the brains of apes, which he examined, he found the decussation of the pyramids as strongly marked as in man. In the dog, though present, it is not particularly distinct. In the domestic cat, he found the decussation of the pyramids very clear, and consisting of eight slender threads, which are interwoven with each other crosswise. In the sheep only he found it very feebly marked, and consisting of only a single fibre; and in the calf it is not very distinct.

In the horse, Professor Mayer found no crossing of the pyramids but six cross fibres, by which the right pyramid is united with the left.

In the hog he was unable to remark any definite well-marked decussation.

In the rabbit it is comparatively weakly developed.

In BIRDS and the AMPHIBIA he found no evidence of it.

He generally found on examining the decussation of the pyramids in the human brain, that the roots of the intervening nervous *fasciculi* proceed from behind or above, and after running in a direction downwards and forwards, unite with the longitudinal fibres or strands of the pyramidal bodies.

ART. VII.—*Anatomical Description of the parts concerned in Surgical and Femoral Hernia.* Translated from the French of M. JULES CLOQUET, *with Lithographic Plates from the original etchings, and a few additional explanatory Notes*, by ANDREW MELVILLE M'WHINNIE, Assistant Teacher of Practical Anatomy at St Bartholomew's Hospital. 8vo. London, 1835. Pp. iv. and 50. Four Plates.

THE reputation of M. Cloquet as an anatomist, the high estimation in which the present work has been held on the continent since its publication in 1817, and its being now accessible to very few, render its appearance in an English dress very acceptable.

The principal works on Hernia having already been reviewed in the 2d, 4th, 12th, and 15th volumes of this Journal, we do not deem it necessary to go over the ground on the present occasion. It is sufficient to say, that the translation has been executed by Mr M'Whinnie in a manner creditable to himself. Some of the less important passages of the original, which were distinguished more for their accuracy and minuteness than their utility, have been judiciously omitted, and the space which they would have occupied has been in a great measure filled by some brief notes, which will be of considerable use to the student in understanding the descriptions of the author.

The lithographic plates are clear and distinct, and give an accurate notion of the position of the different parts described.

In these circumstances, we beg to recommend this translation to those who have no means of obtaining access to the original. To students commencing their investigation of this important branch of Surgical anatomy it cannot fail to be highly useful.

ART. VIII.—*Some Observations on the Preparation and Medicinal Employment of the Ioduret and Hydriodate of Iron.* By ANTONY TODD THOMSON, M. D. &c. &c. London, 1834. 8vo. Pp. 64.

THE ioduret of iron has been known for a considerable time as a chemical substance, chiefly employed in the preparation of the iodide of potassium, or hydriodate of potassa. In preparing this substance, 126 parts of iodine, and from 40 to 50 parts of clean iron filings are mixed in a flask with 1500 parts of water; heat is then applied till the mixture becomes clear, after which it is filtered. The liquor is a solution of hydriodate of protoxide of iron, consisting of hydriodic acid, 127 parts, or one equivalent, and oxide of iron, 36 parts, or one equivalent.

By evaporating the solution nearly to dryness, the acid and oxide are decomposed; water is formed by the union of the hydrogen and oxygen evolved; and a solid combination of iodine and iron, or an iodide, remains, which is found to contain 126 parts, or one equivalent of the former, and 28 parts, or one equivalent of the latter.

This solid preparation,—the iodide or ioduret, forcibly attracts moisture from the atmosphere, and quickly deliquesces; and, in the course of this transition to the fluid state, its water is partly decomposed,—the hydrogen uniting with the iodine, forming hydriodic acid, and the oxygen converting the iron into an oxide; and hence, when the preparation is dissolved,—or even if it be kept dissolved, it forms a brownish precipitate, which is oxide or peroxide of iron, while free iodine is contained in the solution. This circumstance induces Dr Thomson to specify certain precautions to be observed both in the preparation and preservation of the iodide; for the account of which we must refer the reader to the essay of the author.

When prepared according to the conditions specified, the iodide of iron is of an iron gray colour, brittle, breaking with a foliated fracture, and presenting a crystalline texture not unlike that of metallic antimony, though darker in colour. When dry it is inodorous; but moistened it exhales an odour of iodine, and is of an acrid taste. It is fused at 350° Fahrenheit, and at higher temperatures is decomposed, the iodine being volatilized, and leaving a peroxide of iron.

The solution in distilled water, which is a *hydriodate* of iron, varies in colour from a deep greenish brown to a very pale green, with a shade of yellow, or to perfect transparency, according to the neutrality of the salt, and the quantity of water employed. It is decomposed by chlorine, the mineral acids, arsenious acid, meconic acid, and solutions of opium, gallic acid, and tannin, and all vegetables containing them, the alkalies and their carbonates, sulphate of copper, nitrate and per-chloride of mercury, acetate and nitrate of lead, nitrate of silver, quinia and cinchonia, and infusions of foxglove, henbane, nightshade and tobacco, and all vegetable infusions containing starch.

It remains in solution, on the other hand, according to Dr Thomson, with all the saline sulphates, nitrates, muriates, chlorates, and phosphates, and with those bitter vegetable infusions and decoctions which contain neither tannin nor gallic acid.

As this substance consists of two ingredients, which are known to possess very decided properties, both physiological and therapeutic, on the human body, it was natural for Dr Thomson to think that the union thus formed might unite to a certain extent the powers of both; and he was consequently led to believe, that its employment in the practice of medicine would be very beneficial, especially in the treatment of some of those diseases in which the capillary system, as Dr Thomson expresses it, requires to be stimulated, and the tone of the habit to be maintained or brought up to the healthy standard; and he mentions as examples, atonic dyspepsia, strumous affections, chlorosis, amenorrhœa, bronchocele, *Tabes mesenterica*, rickets, incipient *scirrhus*.

According to the results of some experiments performed on his own person by Dr Thomson, the physiological effects of the hydriodate of iron are of the following nature.

> "When taken in doses of from three to five grains, the Hydriodate of Iron makes no sensible impression on the stomach, although it sharpens the appetite and improves the digestive function: it seems to stimulate moderately the intestinal canal through its entire length, as it opens the bowels; and, whilst it produces the black colour of the alvine discharges characteristic of all the preparations of iron, it corrects their fœtor. When it does not affect the bowels, it augments the action of the kidneys, increasing the flow of urine; and, if the solution be taken two or three times a-day, for several successive days, the presence of both the Iodine and the Iron can be readily detected in the urine. The temperature of the skin is moderately elevated, and the insensible perspiration increased. On one occasion, having taken ten grains for a dose, it almost immediately caused an uneasy sensation at the epigastrium, accompanied with nausea that continued for several hours; and a slight degree of headach. These symptoms were relieved by a copious stool, which was perfectly black. Two hours after swallowing the medicine, a large quantity of urine was discharged; and on being tested, it displayed the presence of both the Iodine and the Iron."—Pp. 19, 20.

In evidence of its therapeutic effects, the author gives the details of thirteen cases of one or other forms of the diseases already enumerated, in which its exhibition was certainly followed by very beneficial effects. Though these cases are not very methodically arranged, we must follow the order of the author in any account of them which we are to subjoin.

The cases, in the treatment of which Dr Thomson employs the hydroidate of iron are not very easily referable to distinct nosological heads.

The first case given in the present essay is one of enlargement of the lymphatic glands of the neck, with indications of general disorder of the digestive functions and *amenorrhœa.* Suppuration had taken place in two of the glands. The remedies prescribed were cupping between the shoulders, a combination of mercury, chalk, and ipecacuan, draughts of hydrocyanic acid, the local application of leeches to the most painful tumours, solution of sulphate of zinc to the sores, and at length the solution of iodide of iron internally, and the local application of ointment of ioduretted hydriodate of potass. In about seventy-two days from the commencement of the treatment, and sixty days from the commencement of the administration of the iodide of iron, the catamenia had returned, the tumours were softened, the sores healed, and strength was restored.

The second case appears to have been much more complicated, and rather obscure in origin and nature. The leading symptoms were articular pains, general weakness, *amenorrhœa*, and œdematous swelling of the extremities, and eventually of the whole person, with extreme torpor of the intestinal tube, lowness of spirits, and general nervous disorder. After all remedies had been tried in vain under various practitioners in Edinburgh and London, the iodide of iron was ordered in solution in draughts containing two grains in twelve drachms of distilled water, and along with this, pills of aloes, calomel and ipecacuan to regulate the action of the bowels. The use of gestation, with mild and non-stimulating diet, was also enjoined. In four days after commencing the use of the iodide the œdematous swelling had disappeared, the urine was much augmented, and the bowels acted regularly twice in twenty-four hours. Recovery was at length completed in about three or four weeks more.

The same remedy was exhibited with very good effects in a case of strumous enlargement and ulceration of the third finger of the right hand in a boy of five, of evident strumous habit, and whose general health had been injured by repeated attacks of *bronchitis.*

Dr Thomson subjoins, from the experience of various professional friends, cases of *chlorosis* and syphilitic or mercurial cachectic ulceration, in which the iodide of iron is represented to have produced very beneficial effects.

The chief objection to the whole of these cases being received as evidence of the efficacy of the iodide of iron is, that in not one of them was that metallic salt given alone; and either its use was preceded or conjoined with that of various other medicinal agents, such as calomel, the protoxide of mercury, aloes, ipecacuan, which we know well are extremely useful, by their operation upon the circulation and secretions of the alimentary canal, in removing various states of bad health dependent on disorder of the digestive function. We do not mean to say, however, that the hydriodate of iron may not have been beneficial or really useful in contributing to the favourable results witnessed. We think it very likely that it was. But we must caution those who propose, on the strength of the cases adduced in this essay, to employ the remedy, that they must not be disappointed if they find that all the effects here ascribed to it, do not ensue in their hands from its employment.

As to its influence on scirrhus and on carcinomatous ulceration, of which one case is given in the present essay, we must say that any representation of this kind is calculated to injure the real merits of the remedy. No one who knows what is the nature of a scirrhous tumour, or a cancerous sore, will ever for a moment entertain the expectation that he can, by exhibiting the iodide of iron, or indeed any remedy whatever, remove either the morbid disorganization of the one, or check the destructive ulceration of the other; and it is manifestly unreasonable to expect that the remedy can have any effect on such disorders.

We have made trial of the hydriodate of iron in the prescribed form in various cases; and we find, on the whole, that it is a good remedy. Its efficacy, we must observe, however, is by far most conspicuous in cases of *amenorrhœa*, and in that train of symptoms of languid circulation with which this disorder is so often attended. We must say, nevertheless, that though it is effectual in removing these symptoms, it has not yet, in our hands, shown greater power than the sulphate of iron in restoring the menstrual secretion.

In the cases of mercurial disease, with or without ulceration, in which we have tried the solution, it has not produced permanent benefit.

The dose is two, three, or four grains taken in distilled water three or four times daily. When raised above four grains, it sometimes induces pain and uneasiness of the epigastric region, and it seems to irritate too violently.

In diuretic properties, we have not observed it to be more powerful than the tartrate of iron.

PART III.

MEDICAL INTELLIGENCE.

ANATOMY.

Proportion in which the Obturator Artery arises from the Hypogastric External Iliac, and Epigastric Arteries. By M. JULES CLOQUET.—(*From Recherches Anatomiques sur les Hernies de l'Abdomen.*)—To ascertain in what proportion the obturator artery arises from the hypogastric, external iliac, and epigastric arteries, M. J. Cloquet examined these vessels in 250 subjects, the half of which were males. The following were the results. The obturator artery arose,

	Males.	Females.	Total.
1st, From the hypogastric on both sides,	87	73	160
2d, From the epigastric on both sides, -	21	35	56
3d, From hypogastric on one side and epigastric on the other, - - -	15	13	28
4th, From the femoral, - -	2	4	6
	125	125	250

Of 500 subjects the obturator arose from the hypogastric in 348, viz. 191 males, and 157 females; and from the epigastric or femoral in 152, or 58 males and 94 females. From this it may be inferred, 1*st*, That the cases in which the obturator takes its rise from the hypogastric are the most numerous; their proportion compared with those in which it arises from the epigastric or femoral being nearly as three to one. 2*d*, That the obturator appears to arise from the hypogastric more frequently in the male than in the female.

PHYSIOLOGY.

On Animal Electricity, by M. CHARLES MATTEUCCI, (*Annales de Chimie,* &c. August 1834.) Though the electricity of animals has long been spoken of, it must be confessed that we are still without a clear and precise fact to prove its existence. Wollaston first attempted to explain animal secretions by electric chemistry. Some time ago M. Matteucci by means of the voltaic pile obtained fluids, the nature of which was analogous to some of the animal secretions, and also demonstrated the decomposition of metallic salts introduced into the circulation. In the latter case the alkalis passed into the bile and the acids into the urine. All this, however, did not prove the existence of the electrical state of the secreting organs. In the 42d Volume of this Journal, page 227, we gave an abstract of the results of M. Donne's researches on the chemical properties of the secretions in health and disease. M. Donne showed that the skin and mucous membrane were in opposite states of electricity, and that between the stomach and liver of all animals there existed very powerful electrical currents. The existence of these currents, he explained by the action of the acids and alkalis, which were separated by the different organs. On reflecting on the feeble acidity and alkalinity of the liquids secreted, and the imperfect conductibility of the greater number of organized substances, M. Matteucci was induced to doubt the truth of M. Donne's theory, and to regard the acid and alkaline substances formed, as produced by the opposite electrical states of the secreting organs. The directions of the current besides favoured this supposition. As, however, it was possible to decide the matter by experiment, he determined to have recourse to it.

The reasoning was simple. If this current is owing to the action of the acids and alkalis secreted, it should undoubtedly remain after the death of the animal, because these do not disappear. M. Matteucci selected a rabbit, on touching the stomach and liver of which with the platinum extremities of a galvanometer, he had a deviation of from 15° to 20°, and on cutting away all the blood-vessels and nerves which reach the abdomen superiorly at the diaphragm he found the deviation reduced to 3° or 4°. On cutting off the animal's head, the effect ceased to be produced. It was only on introducing into the spinal chord a metallic wire, and thus exciting strong contractions, that he could sometimes reproduce a transient deviation.

A more accelerated death was tried, and hydrocyanic acid was employed. Into the interior of the breast of another rabbit, the extremity of a glass tube was introduced, communicating with a retort, by which the hydrocyanic acid produced had to traverse the cyanuret of mercury. Death preceded by convulsive movements immediately took place. The current appeared and disappeared, its existence seemed produced as if by jerks, and at last it disappeared.

The acidity and alcalinity of the fluids of the liver and the stomach were always ascertained after death and the cessation of the currents. These results were also verified on numerous frogs. The currents did not cease to be observed even when the acidity of the stomach was destroyed by an alkali. It is then only during life that these electrical states exist, and by life that they are produced. It remains to be discovered by what organs this electricity traverses the body, and by what organs it is produced. M. Pouillet, in a memoir published some time ago in Magendie's Journal, announced that he had never been able to detect electric currents on touching the nerves by the platinum extremities of a galvanometer. M. Nobili constantly observed a current between the muscles and nerves of a prepared frog. M. C. Matteucci lately announced that he had discovered an electric current, on connecting with platinum plates communicating with the galvanometer the two extremities of cut pneumogastric nerves. M. C. Matteucci was not surprised at the results obtained by M. Pouillet, nor at not being always able to verify the results of M. Nobili, after he observed that even a very strong current from a pile of ten pairs of plates, which was made to pass through a prepared frog, never quitted the organs of the animal to enter the wire of the galvanometer. Although this current passes through the muscles alone, or through the nerves, or through both, the galvanometer placed intermediately is not influenced by it, but, on the contrary, the frog is strongly excited. M. C. Matteucci isolated the nerve in the thigh of a frog by cutting away all the muscular part, but the same current still exciting convulsions did not quit the nerve to pass into the wire of the galvanometer, the extremities of which touched the surfaces of the cut muscle. In fine, leaving the muscle untouched, he cut the nerve, and connected the extremities of it round the platinum plates of the galvanometer; the electric current of the pile in this case produced only very weak convulsions, and a deviation scarcely sensible was perceived in the needle.

These results are observed, whatever be the direction of the current in regard to the distribution of the nerves. Disappointed, he returned to his last experiments on the pneumogastric nerves, and on repeating them with all precision he was obliged, in spite of himself, to observe that no current appears in the nerves, and that it is to some foreign causes that its being sometimes present must be attributed.

Opposite electric states exist then in living organs: it is to them in all probability that the secretions are owing, but no means known show by what organs they are produced.

CHEMISTRY.

New process for purifying Benzoic Acid. By Giovanni Righini.—(*From the Gazetta Eclettica di Farmacia.*)—Dissolve the acid in four or five times its weight of sulphuric acid, diluted with six parts of water. During ebullition, add a very small quantity of the purest animal charcoal, filter it, and while cooling, the acid will separate in crystals. Should long beautiful needles not be found, and should it still possess an odour, the operation must be repeated. Collect the crystals on a filter, remove the sulphuric acid by washing, and leave them to dry in the shade. Sulphuric acid dissolves the resin and oil, which render the benzoic acid impure.

To have this acid in beautiful crystals, dissolve in alcohol that which has been previously purified, and put the solution in a subliming apparatus, placed in a sand bath. Manage the fire in such a manner that the alcohol alone shall be volatilized, and long needles, perfectly white, and without odour, will be obtained.

On the Formation of Ammonia during the preparation of the Kermes Mineral in Hydrated Sulphuret of Antimony. By M. Leroy, Pharmacien at Brussels.—(*From the Journal de Chimie Medicale et de Toxicologie,* September 1834.)—On preparing the kermes mineral after the process of Clusel, during the action of separating the kermes deposited by cooling from the liquid which it contained, M. Leroy felt a strong odour, which he could with difficulty distinguish, as the gas which escaped passed before him with such rapidity. He repeated the experiment, taking all possible care to ascertain what occurred. The next morning the gas which he collected was found to be ammonia, which appeared to cover the surface of the liquid where it was formed. The odour was so strong that it was difficult to stand before the vessel which contained the preparation. The little motion communicated to the liquid was sufficient to disengage all the ammonia formed.

The formation of ammonia appeared scarcely sensible when the kermes was prepared for the first time with the subcarbonate of soda and the sulphuret of antimony; but when the solution of soda was used several times, or new sulphuret of antimony, along with that which was precipitated by the action of the subcarbonate, a larger quantity of ammonia was obtained and easily collected. M. Leroy has used the solution six and even eight times successively, and always obtained kermes of a beautiful colour, it being understood that at each trial the quantity of water previously evaporated was replaced.

MEDICAL PATHOLOGY.

On the Natural History of the Insect of the Itch. By M. Raspail.—(*From the Bulletin General de Therapeutique,* September 1834.)—From time immemorial the inhabitants of the south of Europe have recognized the existence of the insect of the itch, and been accustomed to extract and destroy it. In the twelfth century, Abynzoar made special mention of it. In the fifteenth and sixteenth centuries, Ingrasseas, Gabucinus, Laurence Joubert described it, and Moufet, in his *Theatrum Insectorum,* printed 1634, gave a minute account of it. About the same time, Hauptman and Hafeureffer also noticed its existence. The first drawing of it was given by an anonymous contributor to the *Acta Eruditorum* in 1682, and is to be found in page 317, Table xvii. Fig. EEE. This figure of the insect, according to M. Raspail, is not incorrect but caricatured. In 1687, Bonomo wrote a letter to Redi on the subject, which appeared in the *Miscell. Nat. Curios.* for 1691. In this letter Bonomo gave a detailed description and figure of the insect, which popular tradition and old authors had remarked in the pustules of the itch. His description and drawing were taken from nature. Mead, 1703, and Baker and Schwiebe reproduced the figure of

Bonomo, but they contain more details, which, in spite of their incorrectness, show that their observations had been carried farther. In 1691, Bonani published the description and drawing of an insect which Father Baldigiani had found in a pustule on the face of one of the pupils of the Jesuits College at Rome. The figure was the same as that of Bonomo. Schwammerdam, Leewenhoeck, and Reaumur have left nothing which can indicate that they had met with the insect. Linnæus himself founded his specific distinctions on the figures of Bonomo; and as the latter had engraved on the same plate, and with the same incorrectness, the insect of itch and that of meal, he was induced to comprehend as varieties of the same species, two insects of which the specific difference is great. This difference did not escape De Geer, who, in the fifth plate of his seventh volume, depicted both insects with such accuracy as to leave no doubt of their generic differences. In fine, in 1791, Wichman, a physician of Hanover, published a special work on this subject, and Goeze verified the assertions and drawings of Wichman. After that, observers in France were either less fortunate or less skilful and patient, and the insect of the itch eluded their searches. But in 1812, M. J. C. Gales, a pupil of the Hospital St Louis, at the request of M. Alibert, began his researches on the itch, the results of which he gave in his Thesis. M. Gales announced that he had found the insect of the itch, and called as witnesses the most celebrated men of the Institute and of the Faculty of Medicine, who all applauded his success, and declared that they had seen with their own eyes the long lost insect of the itch. The author illustrated his memoir with a beautiful plate designed by M. Meunier, an able natural history painter. Scepticism could not quarrel with a discovery attested by so many illustrious witnesses. The figures of M. Gales became the standard. They appeared in the first editions of M. Alibert's work. They were cited by Latreille as authentic figures, and Lamarck, far from doubting the assertions of M. Gales, was led to believe, on comparing his figures with those of De Geer, that there might be two species of insects in the itch. Nevertheless, one would be inclined to think that the art of rendering this insect visible was a secret of which M. Gales had reserved the right of exclusive possession. From the publication of his thesis, none of the medical men were able to discover it. This want of success in the masters where the pupil had succeeded, produced incredulity; and M. Lugol, the colleague of M. Alibert caused it to be announced in the *Lancette Française* of the 28th July, that he would give a prize of a hundred crowns to the pupil who would show him the insect of the itch in man. A violent discussion took place between the pupils of M. Lugol and those of M. Alibert, which furnished M. Raspail with the opportunity of judging of the reasons of both parties, and of engaging in some original researches on the point. He examined minutely by the microscope nearly 200 pustules daily, but was as unsuccessful as others. He did not, however, conclude that the existence of the insect was fabulous. The authors who had described it were to be depended on, and the exactness of their drawings was admitted by all observers. He attributed his want of success to the influence of the Parisian climate, or that of the medicines used, or his inexperience in finding the lurking place of the insect. All these difficulties existed, however, in the case of M. Gales; and it is difficult to comprehend how he could produce so often what so many masters sought for in vain.

A comparison of the figures of M. Gales with those of the old writers, raised a doubt in the mind of M. Raspail, which was soon removed on placing by the side of M. Meunier's figures the cheese mite, which M. Gales had exhibited for the purpose of deceiving the learned men who attested his discovery of it. To make sure that this was really the case, M. Meynier announced to M. Lugol that he had found the insect, and would exhibit it publicly. This caused a considerable sensation. M. Lugol could not attend, but MM. J. Cloquet, Bailey, and other eminent men were present. Every precaution was taken that no error should arise from the impurity of the water. The glass containing the particles of the itch was placed under the microscope, and M. Meynier spread the water with his finger, when the bystanders on looking, immediately declared that the long-lost insect designed by M. Gales had been found again. M. J. Cloquet exclaimed that it was the same as he had seen a hundred times. As soon as this farce had lasted some time, the truth was told that the insect exhibited was the cheese mite, which M. Meynier had managed to introduce into the liquid, by stirring it with his finger. After this M. Raspail published a dissertation on the subject in the *Annales des Sciences d'Observation,* in which he came to the conclusion, that M. Alibert was wrong in admitting that M. Gales had shown the insect of the itch, and that M. Lugol was also wrong in denying its existence. To demonstrate this M. Raspail published a plate containing the representations given by various authors, among which he took care to insert that of M. Gales. M. Gales made no reply, but M. Patrix undertook his defence, and offered to produce the *Acarus scabiei.* In this he was unsuccessful. He published, however, as a representation of the insect demonstrated by him, the same plate as is to be found in the *Dictionnaire des Sciences Medicales,* changing only the title. This, according to M. Raspail, is only a republication of the figures of the mite by Bonomo in the *Miscellanea Naturæ Curiosorum* for 1691. After 1829, when this discussion took place, no doubt remained of the non-existence of the *Acarus scabiei,* and thus injustice was done to the ancient authors who, as afterwards shown, must really have seen the insect. In 1831, on observing the itch of the horse, M. Raspail found the insect which had been noticed by De Geer, and of which he had given a rude and exaggeratd figure, and became satisfied that the insect of the itch in man would yet be found.

On the 16th of August last M. Alibert announced to M. Lugol, that the insect of the itch had been discovered. M. Renpicci, a student of medicine from Corsica, was astonished on coming to attend the classes in the capital, to find that its existence was disputed, and soon showed it to several. On the 25th August, M. Lugol was convinced that the insect of the itch did really exist, it being shown him and several physicians of Paris. Its characters, however were very different from those of the insect depicted by M. Gales in 1812, which M. Alibert copied in his great work of 1825. Such is a brief outline of the history of the case. We shall give the characters of the insect of the itch, found in man. At first sight it appears white, but on a more attentive examination some reddish brown points are seen on its circumference. It may be seen without a magnifying glass running on a coloured surface. It is about $\frac{3937}{60000}$ of an inch in diameter. With a single glass its feet may be counted, its muzzle distinguished, and all the details recognized which De Geer has given in a manner so vague. If it is looked at lengthways by the microscope, it appears flattened, and in the transparent places it exhibits parallel curved striæ, which give it the appearance of the shell of a fish viewed by the same magnifying power. Its anterior feet and head are capable of being concealed under its body by curving itself downwards, and one would then say that the five organs had been withdrawn within its cell, like the analogous members of the tortoise. This movement is favoured by the conformation of the dorsal surface of the insect, which projects and advances like a roof on the anterior feet and head. The posterior portion of the body placed in the same position presents eight hairs, gradually decreasing in size as they approach the anus. Four of these belong to the posterior feet, and the other four are inserted two on each side of the anus on the four small tubercles, which cannot be well distinguished, unless they be made to project by the point of a needle. On the disk of the dorsal surface numerous brilliant points are distinguished. If we were to confine our observations to this point of view, we would be led to suppose the insect to be flattened and these points to be simple small circles, but we shall be soon undeceived by observing the animal in profile. The great white spot is found to present a thick prominence, the anterior and posterior surfaces are equally enlarged, and each of these small circles of the back is surmounted by an inflexible transparent hair. The four ranges of points which descend towards the anus and towards the head have the longest hairs. The circumferences of the body present lobes of different forms, according to the motions of the animal, and the positions which it assumes. The striæ mentioned above cover the whole surface of the body. They are not simple folds of skin but a large cellular network, of which the cellules are linear and hollow, and the interstices in relief. This network powerfully resists cutting instruments. This resistance is so strong that it would be difficult to kill the insect with the point of a needle while extracting it. M. Raspail found it very difficult with the aid of a lens and his dissecting instruments to bruise and divide it. It glided and rebounded, and the stiff hairs on its back served but to increase the difficulty of its dissection. It was found then that not only the body possessed a certain hardness, but that its feet and muzzle, to which the paws lent an apparent delicacy, by rendering them diaphanous, were scaly and horny. Such is the general and particular appearance of the insect as observed while walking and presenting its back to the eye of the observer. But when it is placed on its back to obtain a view of the inferior surface of its body, its complicated organization requires more minute study. It is then seen that the four anterior feet and the head are implanted in so many cases, which, however, they are unable to enter. These cases form a species of breastplate, having a peculiar effect. The head is inserted into an angle, of which the summit is prolonged on the thorax in a line of a golden red. This head is very simple, purplish, and curved downwards by its sucker, which did not appear formed of any visible system of mandibulary pieces. On being placed in acetic acid, two transparent vesicles were visible, which would at once be taken for the two eyes. On the nape of the neck, two pair of large points were observed, surmounted each by a hair. These hairs when they pass beyond the crooked head appear to be unequal, because two are inserted in the posterior, and two into the anterior pair. The borders of the sheath of the two feet next the head are prolonged as two reddish lines, and approach each other as far as the line which proceeds from the neck of the animal. The borders of the sheath of the other two arise in red lines at the convexity of the lines just mentioned. The legs are composed of four articulations and an oblique basilar portion. Each of the articulations is thick set with hairs, of which those placed on the side are alone seen. The last articulation is thick set, with very short prickles, and armed below with a stiff hair terminating by an expansion, capable of forming a vacuum, by means of which the insect can fix itself to any surface. The articulations are not distinct, and require long observation to get a view of them. These five anterior members are half-covered by the projection of the body as mentioned above.

On the belly two pairs of other organs are perceived, which De Geer has rendered grotesque by four hairs enlarged towards their base and attached to the belly. These pretended hairs are the four posterior legs, which, though much shorter than the anterior ones, possess the same organization with the exception of their not possessing the locomotive apparatus named by M. Raspail, ambulacrum, which is replaced by very long hairs. The anterior are longer than the posterior. The anus sometimes projects, sometimes concealed ; but to render it quite visible the insect must be dried when the *derma* retains its shape from its hardness, while the abdomen is retracted, and the direction of the anus marked through the transparent *derma*. The external colour of the animal is snow white, except its feet and muzzle, but if observed by refraction it is yellow, like all the white tissues of animals. Though the hairs of the anterior members are directed forwards, this is no obstacle to its progress, as it has the faculty of folding its legs and muzzle downwards. Its progress too when it burrows in the skin is facilitated by the presence of the papillæ, which are thick set on its back, and which render retreat impossible. The scaly hardness of its external covering is like the shell of a tortoise, and its ventral surface is striated like its dorsal.

MEDICAL AND SURGICAL JURISPRUDENCE.

Rupture of the Diaphragm and Fracture of the Cranium, in consequence of severe injuries, with remarks on the medico-legal questions to which they give rise, by Dr Davat, *(from the Archives Generales de Medecine,* September 1834.*)* Three men, returning half-drunk from a fair, allowed themselves to be beaten by a fourth, who had drunk as much, and an hour afterwards waited on Dr Davat, having spent the intermediate time in traversing a mile and a-half. The two younger, who had received only some small scratches and slight bruises, made such a noise that Dr Davat got rid of them as fast as he could, without paying attention to the eldest, who sat on a chair without speaking a word, resting his head on his hands, and his elbows on his knees. M. Davat did not speak to him, believing that he assumed this position because he was more drunk than the rest. The other two had answered very eagerly the questions put to them, and never mentioned that one of them had fallen senseless under the blows which he had received. When the two departed, the third, J. V., who never spoke much, rose slowly without assistance, reached the door, walked without staggering, and M. Davat lost sight of them all till the next morning.

During the twelve or fifteen minutes they remained in M. Davat's study, J. V. made no attempt at vomiting, never spoke, continued in the position described above, and gave no sign of uneasiness. On going away, his countenance exhibited only uneasiness. It was six o'clock in the evening when they left M. Davat, and they had a full hour's walk up hill before them. All three remained in the village for more than an hour and a-half, telling every body who would hear them what had happened. Those who surrounded were more anxious to hear than to observe, and no body pitied them. It was remarked, however, that J. V., though standing like the rest, appeared absorbed, did not concern himself about any thing, spoke little, or rather answered only yes or no. It was said that he attempted to vomit, but without effect. He did not complain of any thing.

At last they proceeded on their way towards their hamlet, but when they were only half way J. V. fell from weariness, and did not rise again. He was placed in a mill, where he spent the night. In the morning he was carried home, and M. Davat was sent for. According to the account given by his companions, he became insensible at nine o'clock in the evening, which gives an interval of four hours from the time he was struck till sitting down from fatigue he became comatose, in which state he remained till his death.

J. V. was described by his friends as being of a good peaceable disposition. He did not speak much in general, occasionally drank a little wine, which he bore easily, was vigorous, strong, healthy, and 36 years of age.

On being introduced to the patient M. Davat found him lying on his back. On stripping him to his shirt, it was found unstained. The body in general was perfectly formed and very muscular—not the slightest scratch, bruise, or trace of violence appeared externally, though the body was minutely examined, particularly the head, chest, and abdomen. Nothing appeared externally to account for the alarming symptoms. The clothes were slightly soiled on the back, but the stains appeared to be the result of the moisture imbibed from the dunghill on which he had slept.

The symptoms indicated cerebral hemorrhage, probably external to the encephalic mass, because sensation and motion remained throughout, though the immobility appeared complete. When the patient was pinched he drew back the limb. The skin was generally cold, the limbs were remarkably rigid, the pulse small and weak, the palpebræ half-open, the eye immoveable, the iris dilated, but still slightly sensible to the light—the mouth half open and frothy without any deviation. The respiration was anxious, painful, and difficult—the muscles of inspiration strongly raised the chest, but there was scarcely any pulmonary expansion, and that accompanied by the death rattle. Percussion was not exercised on the chest. Deglutition was still possible, but very difficult. The froth of the mouth seemed to come from the bronchi—not the smallest quantity of the matter contained in the stomach was found in it. The abdomen was flexible, but exhibited nothing peculiar. In despair as to the cause, M. Davat opened a vein in both arms without obtaining any blood, and applied sinapisms to the calves of the legs. The patient died at one P. M. M. Davat knew not whether to attribute this mortal apoplexy to the quantity which the patient had drunk, or to the ill treatment he had received. It was said, to be sure, that he had been struck, but neither could the place where the blows had been given be shown, nor could the nature of the instrument be pointed out; besides, the whole surface of the body was free from lesion of any kind. Whatever it was, a judicial examination of the body was ordered, and M. Davat accompanied Dr Mandé to the dissection. The body was examined forty-four hours after death.

There was very decided rigidity. The thumbs were flexed on the palm of the hand, and the fingers on the thumb. The muscles were retracted and showed vividly their forms. The traits of the countenance were regular, and the mouth was not turned to one side. There was neither ecchymosis, scratch, nor contusion on the surface of the body. There were some cadaveric marks on the back, the result of pressure. While this external examination was going forward, the medical men were informed that the deceased had been struck on the head. Their attention was consequently directed to the scalp, the hairs on which were long, rude and thick, but nothing was found on the external surface. Having cut through the scalp from before backwards, and turned it down upon the ears, the subjacent cellular tissue appeared infiltrated with black blood throughout the posterior part of the head, extending to the interstices between the muscles of the posterior part of the neck. This infiltration, though abundant and extensive, had not ruptured the cells of the cellular tissue, so that no collection of blood was found. It was confined between the pericranium and the derma of the scalp, which was scarcely blackened. On the left parietal protuberance there was a slight longitudinal sanguineous infiltration. There the cellular tissue was slightly separated or torn, but the hairy scalp which covered it presented no observable contusion, or the slightest visible lesion, so that this could not have produced the extravasation of blood mentioned.

After having raised the bloody cellular tissue and the pericranium, two large fractures appeared, the one longitudinal, the other transverse, uniting at a right angle on the left parietal protuberance. From the point of union, several smaller fractures extended in rays to the neighbouring bones to the extent of one or two inches. The centre of all these different fractures exhibited a fissure communicating with the cavity of the cranium, by which the infiltrated blood had been effused through the cellular tissue.

The longitudinal fracture extended from behind forwards. Commencing at the posterior border of the *foramen magnum*, it traversed the occipital, left parietal, frontal, and body of the sphenoid bone, and ended at the spheno-basilar articulation.

The transverse fracture extended from the articulation of the left parietal with the temporal to the middle of the squamous portion of the right temporal. Its direction across the parietal bones was obliquely from left to right. It cut at an acute angle the line of the longitudinal fracture, directly on the left occipital protuberance, passed half an inch farther forward than the right parietal protuberance, and lost itself about the middle of the squamous portion of the right temporal, which was splintered by a counter blow. On raising the skull cap, the fractures above described extended through the whole thickness of the bone; and under the parietal protuberance between the disengaged *dura mater* and the bone, there was an effusion of coagulated blood to the amount of about two ounces. The separation of the *dura mater* was to the extent of four inches. The hemorrhage was probably caused by some of the splinters, which had wounded some of the branches of the middle meningeal artery. No other bloody effusion existed on the surface of the cranium, the splinters of the fractured portion of the temporal were not displaced, and no hemorrhage accompanied the fracture of the body of the sphenoid. The cerebral substance was not injured in any part. The left hemisphere bore the mark of the depression which it had suffered, but its parenchyma was without apparent lesion.

The abdominal parietes did not, either superficially nor in the thickness of the muscles which composed them, present ecchymosis, contusion, or any thing else. The liver, kidneys, spleen, and intestines were even in a healthy state.

On examining the stomach the great *cul de sac* had disappeared. A longitudinal laceration across the diaphragm, especially its phrenic centre, had allowed it to pass into the cavity of the thorax. This laceration was recent, two inches and a half in extent, and presented some floating shreds yet bloody, but these bloody little drops were so little characterized that it would have been imprudent to have drawn any conclusion from them. The edges of the laceration did not adhere to the herniated stomach, which had compressed the opening so as to render its borders scarcely red or rather pale, so that little blood had escaped, and this, besides, was mixed with the matters effused into the pleura, so as to be recognized with difficulty.

The abdomen contained no foreign matter, and nothing was effused into its cavity.

The herniated portion of the stomach was ruptured, and its contents had escaped into the thorax. These consisted of dry vegetables, meat, bread, wine, &c. in a state scarcely digested, and filled two soup plates.

The laceration of the great *cul de sac* of the stomach extended to an inch and a half on its superior surface. Its circumference was red, unequal, and as it were broken, and the blood was not coagulated at the extremity of the open vessels. Pressure round about was sufficient to cause the blood to ooze out in small quantity. Except this opening which presented nothing more on its edges, the stomach was quite healthy.

The blood effused from this wound, like that from the wound of the diaphragm was mixed with matters contained in the pleura, and the clots of blood were with difficulty distinguished from the aliments which had been traced by a rich coloured wine. Besides little blood being effused, the clots were small and rare.

The whole inferior lobe of the left lung had been pressed upwards and backwards, while the surface of the pleura in contact with the effusion was red, and its capillaries much infiltrated. This infiltration was a true inflammatory bloody clotting, on the surface of which were developed here and there small pseudo-membranous whitish patches few in number. The bladder contained a considerable quantity of urine.

On reading the above three questions suggest themselves, 1*st*, was the patient dead or alive when he was struck? 2*d*, were the lesions the result of a blow or a fall? 3*d*, could he have sustained all the lesions mentioned when he presented himself to Dr Davat at six o'clock P. M. an hour after he had been struck?

I. The patient must have been struck when alive, 1*st*, Because he had been seen during life with all the symptoms characteristic of the lesions observed on opening the body; 2*d*, Because it is impossible to produce in a dead body all the appearances which accompanied the fractures of the cranium, viz. the separation of the *dura mater* to the extent of five inches with effusion of coagulated blood, the passage of the blood outwards through the fracture, and the infiltration of the cellular tissue covering the cranium; 3d, Because it is difficult to produce rupture of the diaphragm, and still more so of the stomach of a dead body; and 4th, Because when such ruptures are produced small clots of blood similar to those found in the cavity of the left pleura are never met with.

II. On the question, as to whether the lesions were the result of a fall or a blow, M. Davat makes the following observations. In falls it is most frequently the large viscera, as the liver, spleen, &c. that are ruptured. In the present case they were in a perfectly normal state.

The fractures of the head could have been caused only by a hard round body producing its effects by one blow, and rather by its velocity than its weight. The external violence was applied on the left parietal protuberance, the point where all the fractures met, or rather whence they all proceeded. The counter fracture of the right temporal, the situation of this fracture, its position with reference to that of the left parietal, indicate the direction in which the violence acted; and since it has been remarked, that the direction of the great longitudinal and transverse fractures is slightly oblique from left to right, it will appear that the tangential violence could act only by producing with the perpendicular diameter of the head a very obtuse angle. In whatever situation the body was placed, it was impossible for such a fall to have happened on the parietal. The rupture of the diaphragm and the stomach can be explained only by the action of some external violence driving the intestinal mass upwards. The substance must have been caused by something pliable, and it must have acted very readily at one blow with extraordinary violence, because the abdominal parietes presented no lesion.

No object fulfils all these conditions better than the knee.

At the moment of the injury the stomach was distended by food. The violence drove it through the contracted diaphragm, and, not being all expended, terminated by tearing the stomach. A fall could not have produced this. Had it been the effect of the wheel of a carriage it would have been indicated by marks on the clothes, or extensive lesions in the abdomen. The cause, then, which produced the injury of the stomach and diaphragm was evidently a blow. This must have occurred during life, as M. Davat proved by the following experiments. Having filled the stomach of a subject with various alimentary substances, reduced as if by mastication, and tied the œsophagus, he struck vigorously and rapidly the epigastric region. Rarely and with difficulty with one blow was rupture of the stomach produced. It was only once in six times that he accomplished it, and in this case the stomach was distended with a quantity of matter which he believed it incapable of containing during life. By frequent percussion it was always ruptured, provided it was not almost empty, and this rupture was produced more easily, in proportion as the tissues of the stomach were softened by decomposition, inflammation, or maceration by its contents. By one or two percussions the diaphragm was never ruptured, the stomach was ruptured on one or other of its surfaces, sometimes in two places at once, and the matter was effused into the cavity of the abdomen.

From what has now been mentioned, it would appear that the vital forces exercise some influence on the frequency of ruptures of the diaphragm. In order to produce a force acting in some measure like vital contractility, M. Davat distended the intestines with as much air as they could hold, after having previously filled the stomach, tied the œsophagus, and inflated the lungs. The diaphragm was then ruptured as well as the stomach, but the stomach did not protrude into the cavity of the pleura, and the matters contained in it were effused into the abdomen.

To ascertain all the influence of this muscular contractility, as well animal as organic, on the frequence of ruptures of the diaphragm or stomach. M. Davat made some experiments on living animals, and remarked, that it was not indifferent whether the percussion was made during inspiration or expiration. Percussion during inspiration produced almost always a double rupture, 1*st*, of the diaphragm, and 2*d*, of the stomach. The hernia of the latter through the diaphragm appeared to be owing to muscular effort alone.

When any one is struck during inspiration on the epigastric region, the stomach being filled with food, the diaphragm contracts and suddenly corrugates as well as the stomach. These two organs suddenly rendered tense become immoveable, and so to speak attentive to the shock. The diaphragm is perhap salready ruptured, whilst the expiratory abdominal muscles, suddenly contracting, add their force to that of the percussion, and produce hernia of the stomach. During this, the acting force traverses the soft parts which retard it. Partially broken it follows the curvature of the stomach, arrives at the terminated portion, is concentrated anew, because it comes in contact with nothing by which it may be propagated, or because it is retained, and expends itself in lacerating the part. From all these considerations, M. Davat concludes that the lesions were produced during life.

III. The third question is, had all the lesions been inflicted on J. V. when he called on M. Davat at six o'clock in the evening? The solution of this was of great consequence, as upon it depended the possibility of the guilt of the person first accused. To answer it in the affirmative was tantamount to declaring that his life of relation could exist for more than three hours, that he could walk a league and speak without complaining much, after a double rupture of the diaphragm and stomach, effusion of the aliments into the pleura, compression of the inferior lobe of the lung, with a fourfold fracture of the bones of the head, lesions which must necessarily speedily produce death, if they did not do so at once. From what information was obtained, it was evident that he had been beaten. His companions did not say that he had been stunned by the blows, which they would have done if they could, as being a circumstance in their favour. He was only stupified, they said, walked slowly, sometimes by himself, sometimes leaning on the arm of the others, and never spoke a word. Previously to coming to M. Davat, they had walked half a league on foot. J. V. sat down as mentioned above, rested his head on his hands, and remained so till he left: All this time he did not complain, his respiration did not appear painful, his physiognomy had nothing extraordinary in it; he rose without assistance, and retired with his comrades. His walk was slow, grave, but not unsteady. His clothes were clean. After leaving M. Davat's house, he remained with his companions for more than an hour in the village, almost constantly on foot, searching, however, for commodious places where he might support himself. He neither complained, nor spoke a word, nor asked for any thing, but attending to and understanding what was said. It was asserted that he made some efforts to vomit, but without effect. He remained in this situation till nine o'clock in the evening. To reconcile these facts with the lesions found is certainly difficult. It may be added, that of all these evidently mortal lesions, no one was so instantaneously; that the patient was stout, of a vigorous constitution, habituated to fatigue, that he had drunk a little more wine than usual; and that it may be so far conceived that the exciting and stupifying power of the wine might have made him momentarily forget his pains, giving him power to speak and walk till he fell under the effect of the compression of the brain, produced by the sanguineous effusion. From the position of the origin of the effusion, the compression must have been slow and gradual, because the blood which was effused must have separated the periosteum, which it is very difficult to do. J. V. then might have had the lesions of the cranium when he appeared before M. Davat. As to the lesions of the diaphragm, stomach, and lung, it is extremely difficult to believe in their compatibility with life for some hours. In the absence of facts to judge by, M. Davat consulted several eminent men of the profession. Their opinions varied; some thought life for several hours incompatible with such lesions, others thought it possible; and others, without denying the possibility of the circumstance, were not disposed to admit readilyot its occurrence. The last is M. Davat's opinion. After noticing the effects on the stomach of killing an animal during digestion, M. Davat observes, that, considering that the borders of the rupture were not red; that the quantity of blood effused was small; that black blood oozed from the extremity of the torn vessels on the neighbouring parts being compressed, there is some reason to believe that the rupture took place after death. Considering, too, that the rupture of the diaphragm was four inches and a-half in extent, that there was no anhelation, nothing abnormal in inspiration and expiration, it is difficult to conceive it possible that the lesion took place at the same time as the fractures. All the cases on record where the diaphragm in horses was ruptured proved immediately fatal. The same may be said of all happening to men excepting one, where the patient survived some time, and died of another injury. In this case, however, there was distressing cough, difficult respiration, and pain. If such be the case, how much more likely is it that death would occur immediately if to the rupture of the diaphragm there were superadded hernia and laceration of the stomach and effusion of its contents into the thorax. Our own opinion is, that when J. V. presented himself before M. Davat he had sustained the fractures of the cranium, but that the injuries of the diaphragm, stomach, and lung, were incompatible with life for many seconds. The accused was condemned by the criminal court; but, in consideration of the alleviating circumstances, the sentence was commuted to seven years hard labour.

We may mention that there is a case narrated by Lieutaud, (Hist. Anatomico-Medic. Lib. ii. Observ. 779) of a man addicted to drinking, and who had complained of various pains resembling rheumatism, being suddenly seized with cough and vomiting, and dying soon after. On inspection, the diaphragm was found ruptured, the stomach protruding into the thorax and ruptured, and the contents effused into the chest. In this case the difficulty of breathing was very great.

Notice to Students of Medicine,—The Harveian Society of Edinburgh has fixed on the following subject for their Prize Essay for the year 1836, viz. "*The Chemical and Medicinal properties of Creosote, with the best mode of preparing it.*"

Dissertations on this subject must be transmitted to either of the Secretaries on or before the 1st day of January 1836. Each Dissertation must be accompanied by a sealed Letter, containing the Name and Address of the Author, and inscribed on the back with a Motto. The same Motto must also be prefixed to the Dissertation to which the Letter belongs.

The Prize given by the Society to the successful Candidate, is either a Copy of the Quarto Edition of Dr Harvey's Works, published by the College of Physicians of London; or a Silver Medal, with a suitable Inscription, at the option of the Candidate. The Prize is presented to the successful Candidate at the Annual Festival in April.

The Candidate is at liberty to employ his Dissertation afterwards, in any way he may think proper: And, accordingly, some Dissertations, presented to the Harveian Society, have, in consequence of publication, been productive of considerable honour and emolument to the Authors.—By order of the Society,

RICHARD HUIE, M. D., 8. George Square. } *Secretaries.*
RICHARD Poole, M. D., 11. Antigua Street. }
Edinburgh, 12th March 1835.

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